PHYSICAL ACTIVITY LAPSES
AND PARENTAL SOCIAL CONTROL

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By

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ABSTRACT

Although physical activity has been identified as important for children and adolescents' health, a majority are not active enough to receive health benefits. Given that physical activity lapses have been identified in adolescents, and social influences have been related to physical activity, the overall purpose of this dissertation was to explore the social influences that occur following a lapse by using a social control framework. Three studies were conducted to examine whether physical activity lapses would be associated with parental use of social control (Study 1 and 2) as well as whether this use of different social control types would be associated with changes in behaviour (Study 2 and 3) and affect (Study 3). Results from Study 1 revealed that parents reported the use of three types of social control (i.e., positive, collaborative, and negative) following a hypothetical physical activity lapse. Results from Study 2 revealed that adolescents who experienced a lapse reported greater increases in the use of positive and collaborative social control if they had an active family. Changes in social control also were associated adolescent's recovery from a lapse, with collaborative social control emerging as the strongest social control type. Results from the third study revealed that each of the three types of social control were associated with behaviour change, but in a different way. Behaviour change was associated with the use of collaborative social control, the need for congruence between preferences and use for positive social control, and the perceptions of negative social control as supportive. Perceived supportiveness for all tactics was related to affect. These results provide preliminary support for the suggestion that social control may be one framework to help explain the use of parental social influences following a lapse. Future directions and complementary theories are discussed.

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CHAPTER 1
INTRODUCTION

There are numerous health benefits associated with being physically active in childhood and adolescence including reduced cardiovascular risk (Andersen et al., 2006), reduced rates of obesity (Must & Tybor, 2005), and improved bone accrual (MacKelvie, Khan, & McKay, 2002). Despite these health benefits, it has been reported that more than 50% of children and adolescents are not active enough to accrue optimal health benefits from physical activity (Craig, Cameron, Russell, & Beaulieu, 2001). As such, the examination of factors that might contribute to maintaining physical activity at an appropriate level would appear important.

In regard to maintenance of physical activity, the examination of activity lapses may be worthwhile, where a lapse is described as a single event triggering the re-emergence of a previous habit (being sedentary), or a slip from a higher level of activity to a lower level of activity (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). If lapses repeatedly occur, or occur for long durations, the possibility arises that they may continue into a relapse (i.e., an outcome or a state where the lapse has become the status quo, Brownell et al., 1986), thus ushering in the possible start of a less healthy lifestyle owing to a decline in active behaviour.

Adolescence might be a period of particular interest for examining lapses, as longitudinal studies have reported that levels of physical activity decline and sedentary behaviour increases during this period (Brodersen, Steptoe, Boniface, Wardle, & Hillsdon, 2007; Dovey, Reeder, & Chalmers, 1998). It could be speculated that some of this decline in physical activity during adolescence might be captured in active adolescents experiencing lapses. Thus, an understanding of how significant others respond to these lapses, and what effect these responses have on subsequent activity, may provide us with some insight into the dynamic nature of physical activity (cf. Mulder, Ranchor, Sanderman, Bouma, & van den Heuvel, 1998). In turn, such evidence might assist in the identification of ways to encourage the maintenance of a physically active lifestyle by helping in the recovery from lapses.

In understanding lapses, the identification of salient correlates becomes important. Generally speaking, an examination of activity correlates reveals that social factors have featured prominently in child and adolescent populations (Sallis, Prochaska, & Taylor, 2000), with many studies examining the social influence-physical activity relationship (e.g., Duncan, Duncan, & Strycker, 2005; Shields et al., 2008; Voorhees et al., 2005). However, the examination of social factors that might be associated with a lapse in physical activity has received limited attention (Shields et al., 2008).

A review of the studies examining lapses in physical activity (Conroy et al., 2007; Shields et al., 2008; Simkin & Gross, 1994) reveals that those which considered social factors are even more limited (Shields et al., 2008). For example, in adolescents who had experienced a lapse, the effect of family influences prior to a lapse on increased physical activity following a lapse was mediated by self-efficacy (Shields et al., 2008). These findings suggest that social factors may be associated with lapse behaviour and, as such, warrant further examination.

1.1 Social Influence and Activity

Social influence has been defined as "the processes whereby people directly or indirectly influence the thoughts, feelings, and actions of others." (Turner, 1991, p. 1). It is interesting to note that many studies examining social influences in the activity area use the term social support to describe the different social influences provided (e.g., Duncan, Duncan, Strycker, & Chaumeton, 2007; Gustafson & Rhodes, 2006; Hohepa, Scragg, Schofield, Kolt, & Schaaf, 2007). While the majority of social influence research has been framed as social support, social influence can be conceived of in other ways (S. Cohen, Gottlieb, & Underwood, 2000). One type of social influence that has received little attention in the child and adolescent physical activity literature is social control.

1.2 Social Control

Social control is a construct that has received much attention in sociology and social psychology (Clark & Gibbs, 1965; Meier, 1982). It can be conceived as a form of social influence that involves regulatory action (real or perceived) by one individual in response to deviant acts of another (Lewis & Butterfield, 2005).

Early research on social control was limited by an inadequate definition of the construct, which tended to be either too broad or too narrow (Clark & Gibbs, 1965). For

example, one broad definition couched social control in terms of the processes by which individuals acquire society's values (Hollingshead, 1941). In contrast, social control as an individual's status within interpersonal relationships is an example of a narrow definition (LaPiere, 1954). Consistent with these diverse conceptualizations (Meier, 1982), it was suggested that social control could be exerted at the macro or societal level (i.e., maintaining the social order, Ross, 1896) as well as at the micro level or within social relationships (Clark & Gibbs, 1965).

Refining previous definitions, Clark and Gibbs (1965) described social control as the social reaction to any behaviour that violates a norm, or is viewed as deviant. Within their conceptualization of social control, Clark and Gibbs (1965) emphasized that social control did not look at why someone was deviant, but rather the behavioural reaction to that deviance in terms of the use of social influence tactics. This reaction to deviant behaviour at the micro level forms the focus for this dissertation.

1.3 Health-Related Social Control

Given its proposed regulatory function, it may not be too surprising that social control has been linked to healthy behaviours. In terms of health, for instance, it has been known for some time that married individuals have lower rates of all-cause mortality, and mortality to a variety of causes including accidental motor vehicle death, lung cancer, and diabetes than unmarried individuals (Gove, 1973). It was suggested that the delivery of social control by significant others to encourage deviant individuals to perform the desired health practices might be one explanation for the improved health status and decreased the risk of mortality of those individuals (Umberson, 1987). Additionally, the enactment of this regulatory function following deviant behaviour has been seen with other health behaviours such as eating behaviours (Markey, Gomel, & Markey, 2008) and smoking (Westmaas, Wild, & Ferrence, 2002).

1.3.1 Types of Health-Related Social Control

Social control has been described in two different ways: direct and indirect. The focus for this dissertation was on direct social control, which involves attempts by someone to prompt, persuade, or influence another to perform a desired behaviour (Fekete, Stephens, Druley, & Greene, 2006; Lewis, Butterfield, Darbes, & Johnston-Brooks, 2004). This contrasts with indirect social control, which refers to the influence that comes from being

embedded in a social network and feeling a sense of responsibility to take care of one's own health for the sake of others (Helgeson, Novak, Lepore, & Eton, 2004).

1.3.2 Parents and Social Control

As the social control literature has focused primarily on spousal control within adults and older adults (Fekete et al., 2006; M. M. Franks et al., 2006; Lewis & Rook, 1999; Tucker & Anders, 2001; Tucker & Mueller, 2000), it has been suggested that there is a need to explore other relationships including the parent-child relationship (Lewis et al., 2004). In the past, families have been thought to play a vital role in the use of social control to help prevent delinquent behaviour in adolescents (Nye, 1958). This continues to be the case, as it is thought that one aspect of a parent's role is to shape the development of his/her child (Dishion & McMahon, 1998). Within family relationships, social control may be seen as helping with the internalization of norms and providing informal sanctions when norms for healthy behaviours (e.g., being active) are violated (Umberson, 1987). As such, the parent-child relationship might be a possible setting for the use of social control with respect to a deviation in an adolescent's health behaviours, such as a lapse in physical activity.

In terms of those channels of social influence that are used to encourage activity parents have received some attention. Small to moderate sized effects have been reported relative to parents influencing their children's physical activity (Pugliese & Tinsley, 2007). For instance, one review noted that parent support and direct help with physical activity were among the social influences consistently related to physical activity in adolescents (Sallis et al., 2000). Similarly, another review reported that family influences were positively associated with adolescent physical activity (Van Der Horst, Paw, Twisk, & Van Mechelen, 2007). These studies highlight the role that parental influences may play in their child's physical activity.

1.4 Conceptual Model

Typically, social control research has been characterized by a lack of theory (Clark & Gibbs, 1965). However, various researchers have provided conceptual models to describe social control and its relationship to behaviour (e.g., Lewis & Butterfield, 2005; Umberson, 1987). For the current study, the antecedents-consequences social control conceptual framework outlined by Lewis and Butterfield (2005) for health behaviours was adapted for the physical activity lapse situation (see Figure 1.1). The relationships identified in Figure 1.1

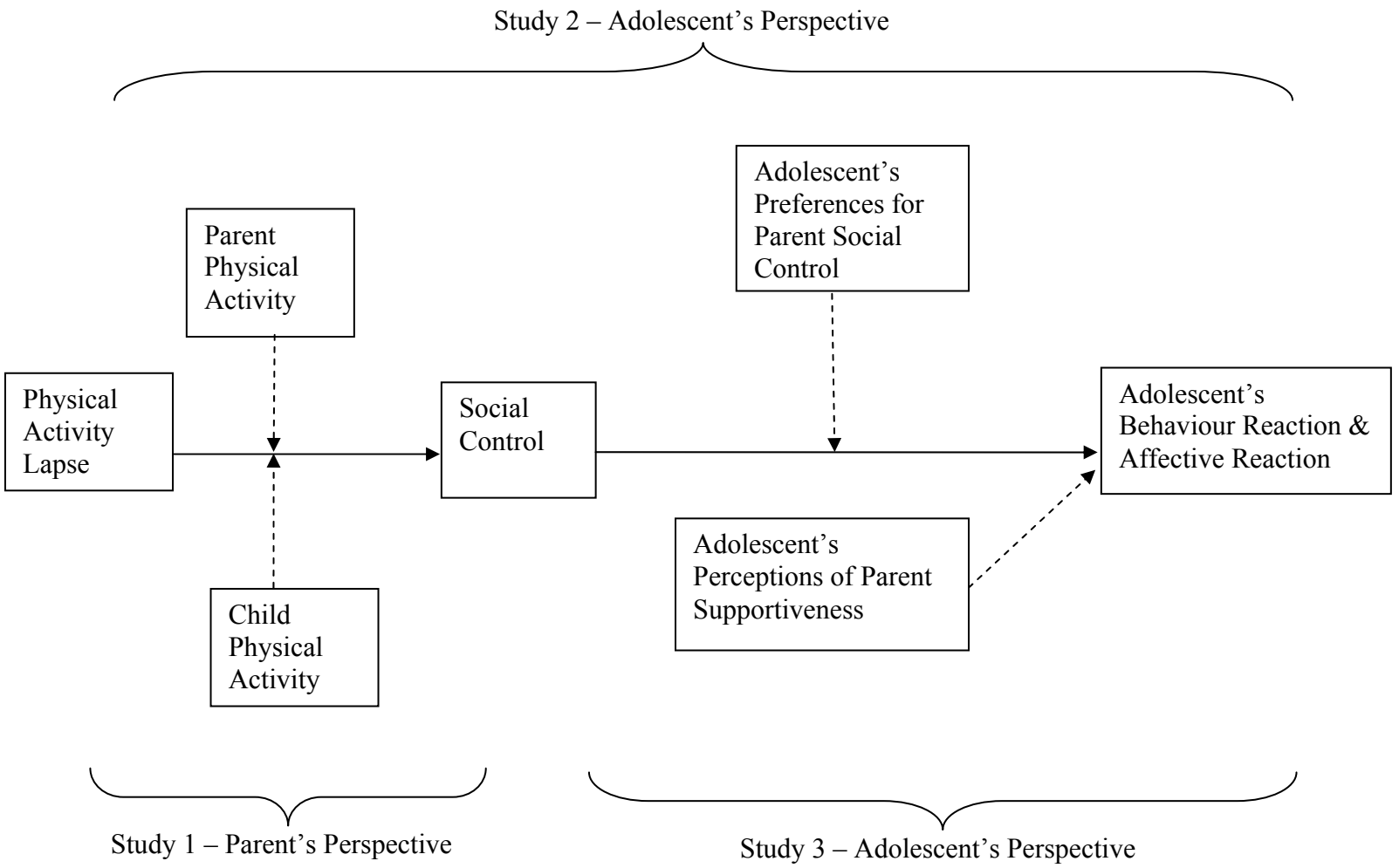

Figure 1.1 Conceptual Model for Parent's Use of Social Control Following a Physical Activity Lapse (Modified from Lewis & Butterfield, 2005)

outline the conceptual framework used in this dissertation to examine how a lapse in physical activity might prompt parents' use of social control, and subsequently, impact the behavioural response of the child. These specific relationships are described below.

1.4.1 Lapses as Antecedents of Social Control Use

Antecedents are factors that influence the use of social control (Lewis & Butterfield, 2005). In their model, Lewis and Butterfield (2005) suggested that antecedents to social control were factors that affected the extent to which behaviour was perceived as 'deviant' or health threatening.

Physical activity is viewed by a large proportion of parents as necessary to achieve health benefits for their children (Cameron, Craig, & Paolin, 2005). With parents viewing physical activity as beneficial for health, it is conceivable that lapses in activity may be perceived by parents as their child no longer receiving the associated health benefits. When an individual perceives serious health consequences associated with an undesirable behaviour, social control is exerted (Lewis & Butterfield, 2005). With this in mind, when a lapse in activity occurs, and a parent believes his/her child is no longer receiving health benefits, the parent would be expected to exert social control. Thus, a physical activity lapse was felt to be a key antecedent that would initiate social control attempts.

1.4.1.1 Possible Moderators of the Lapse as an Antecedent

As physical activity lapses are expected to elicit the use of social control tactics by the parent, the question arises as to whether this would always be the case. One factor that may alter the physical activity lapse - social control relationship may be the norms for the child's physical activity that are inherent in the situation. As noted above, norms are embedded in the construct of social control in that norm violation is suggested to prompt social control use (Butterfield & Lewis, 2002; Lewis & Butterfield, 2005; Parsons, 1951; Umberson, 1987). Thus, in the physical activity context, one might expect social control to be exerted by parents in response to a physical activity lapse when a norm or expectation that the child be physically active is present. With this in mind, possible moderators of the use of social control may be factors that are associated with the formation of activity norms.

Norms may be formed from a variety of sources of information including the individuals' own behaviour and the observable behaviour of others (Miller & Prentice, 1996). In terms of the former, one source of information for norm formation around being active

may be the parent's own physical activity level. In one study examining the use of social control, Lewis and Butterfield (2005) purposely sampled individuals who were currently performing the desired behaviour (i.e., being active), and then manipulated that behaviour in others to show violations, with the implicit assumption being that the active individuals would view violations of the health behaviour as a counter normative. Although Lewis and Butterfield (2005) implicitly recognized the role of the provider's behaviour in the use of social control by only sampling individuals currently doing the behaviour, the role of the provider's behaviour in the provision of social control was only assumed, but not evaluated. In the present dissertation, the level of activity of the parent (i.e., as social control provider) was considered as a possible moderator of the physical activity lapse - social control relationship.

In terms of norm formation based on observing another's behaviour, another possible source of information for parents developing norms surrounding their child's physical activity behaviour may come from the child's typical activity behaviour (Miller & Prentice, 1996). As parents may draw on their child's past or typical behaviour when deciding the level of physical activity that their child should be performing, child's typical activity level was examined as another possible moderator of the physical activity lapse - social control relationship.

1.4.2 Consequences of Social Control Use Following a Lapse

To explore whether the use of social control tactics result in the desired behaviour change, it is of equal importance to understand how the recipient of the controlling influence reacts to the influence (i.e., the consequences), as noted by Lewis and Butterfield (2005). For example, if a messy room violates a parent's norm or expectation for how a room should be kept (i.e., viewed as deviant), the parent may nag the adolescent in an attempt to get him/her to perform the desired behaviour (e.g., clean his/her room). Nagging by a parent to clean a room may result in that adolescent cleaning the room (performing the behaviour), but it also might result in the adolescent being upset about the nagging (e.g., his/her affect might change).

In terms of physical activity, if the social control following a lapse is effective, a child should return to being active and achieve the accompanying health benefits. Similar to the conceptual model outlined by Lewis and Butterfield (2005), the consequences considered in

the model used in this dissertation focus on the child's reactions to the use of social control in terms of changes in activity behaviour and affective responses to the social influence.

1.4.2.3 Possible Moderators of the Social Control – Consequence Relationship

As the relationship between the use of social control tactics and the reaction in terms of subsequent behaviour (M. M. Franks et al., 2006; Westmaas et al., 2002) and affect (Rook, Thuras, & Lewis, 1990; Tucker & Anders, 2001) have been mixed, examination of possible moderators may serve to explain the inconsistent findings. Lewis and Butterfield (2005) recognized that other factors (i.e., moderators) may influence individuals' reactions to social control attempts. Two possible moderators that were examined in this dissertation include (1) adolescents' preferences for the social control provided by parents and (2) adolescents' perceptions of whether their parents were trying to support their behaviour when influences were being used.

1.5 Overall Purpose

Given the importance of physical activity for health benefits (Warburton, Nicol, & Bredin, 2006), and the fact that physical activity lapses have received little attention in the adolescent physical activity – adherence research, the purpose of this dissertation was to further the understanding of the use of social influences following a physical activity lapse by exploring health-related social control. This dissertation examines whether a physical activity lapse (i.e., an antecedent) contributes to the use of social control tactics by parents, and the consequences (i.e., behaviour and affective reactions) of this use for adolescents.

Each of the following three chapters in this dissertation is a separate manuscript reporting on the results from three separate studies. In the first study, social control responses to a physical activity lapse were examined by determining whether a hypothetical physical activity lapse manipulating severity of health consequences was associated with parents' use of social control. In addition, possible moderators (e.g., parental and child activity) that may contribute to the formation of a parental norms for their child's physical activity were explored.

While the first study examined the social control provided following a physical activity lapse from the parent's perspective, the second study examined the adolescent's perspective. In essence, the second study extended the first by looking at how social control changed following an actual lapse in physical activity from the perspective of the adolescent.

This second study also explored the consequences of social control by examining whether changes in parental social control tactics were associated with changes in adolescent's physical activity behaviour following a physical activity lapse.

The third study focused on how adolescents reacted (i.e., the consequences) to their parent's use of social control following a physical activity lapse by exploring how perceived use of social control following a lapse was related to behaviour change and affect. In addition, possible moderators that might alter the behavioural and affective reaction to social control attempts were explored (i.e., adolescent's preferences for the use of parents' social control and perceptions of parent supportiveness). Following the presentation of the three studies, a general discussion is presented.

CHAPTER 2

STUDY 1: CHILD'S ACTIVITY LAPSES: PARENT'S USE OF SOCIAL CONTROL

Physical activity during childhood and adolescence has been associated with numerous health benefits such as reduced cardiovascular risk (Andersen et al., 2006) and reduced rates of obesity (Must & Tybor, 2005). However, maintenance of physical activity has been shown to be difficult, as the results from longitudinal studies have revealed that individuals decrease their physical activity during adolescence (Brodersen et al., 2007; Dovey et al., 1998).

While the maintenance of activity has been examined from a number of perspectives, one that has received little attention both in adults (Conroy et al., 2007; Simkin & Gross, 1994), and in children and adolescents specifically (Shields et al., 2008), is activity lapses, where a lapse is defined as a slip from a higher level of activity to a lower level (Brownell et al., 1986). This is surprising given that lapses are common with physical activity behaviour (Conroy et al., 2007; Sallis et al., 1990). Thus, understanding the social influences surrounding a lapse may provide insight into recovery from this fall in physical activity.

Evidence from the activity area would suggest that parental influences are positively associated with child and adolescent physical activity, which implies that lower levels of activity are associated with less parental influences (Pugliese & Tinsley, 2007; Van Der Horst et al., 2007). For instance, it has been found that parents tend to provide less encouragement for being active when adolescents are less active (Hohepa et al., 2007), suggesting that during times of decreasing activity (i.e., lapses) parental influences also decrease.

While this positive relationship appears plausible, an examination of other health behaviours suggests the possibility of a negative relationship emerging that is associated more with the idea of behaviour regulation. With health behaviours, important others have been shown to play a role in regulating another's health behaviours by exerting social control (Lewis & Butterfield, 2005; Markey et al., 2008; Umberson, 1992), where social control can be thought as a regulatory type of social influence. Social control is considered to be used by

others when an individual deviates from a desired health behaviour or performs an unhealthy behaviour (Lewis & Butterfield, 2005). As the majority of parents view physical activities as beneficial for the health of their child (Cameron et al., 2005), parents may see a physical activity lapse as a threat to their child's health, and as such, use social control in an attempt to increase (i.e., regulate) their child's behaviour following a lapse in activity. From this perspective, a physical activity lapse should result in greater, not lesser, use of social influences by parents. Figure 2.1 provides a schematic of these two possible relationships.

As noted above, deviation from behaviour has resulted in the use of more social control with other health behaviours. For instance, when individuals perceived a situation as a potential health threat for their partners, social control was exerted (Lewis & Butterfield, 2005). As physical activity is perceived as a health behaviour (Cameron et al., 2005), the first purpose of this study was to explore whether parents would use more social control tactics when faced with a lapse in their child's activity.

Given that social control is prompted when behaviour is viewed as health threatening or violating a norm (Lewis & Butterfield, 2005), it might be speculated that lapses that violate parents' expectations for health-related activity would influence their social control attempts. It was hypothesized that when a lapse signified that a child was no longer active enough to meet the parents' expectations for achieving health benefits (i.e., deviant drop), parents would use more social control. However, when a lapse occurred that did not violate the parents' expectations (i.e., acceptable drop), no change in social control would be expected. In contrast, the typical findings of a positive relationship between social influences and activity would suggest a different relationship (Pugliese & Tinsley, 2007). That is, during a larger lapse (i.e., deviant drop), which involves a greater decrease in activity (and consequently a lower overall level of activity), less social influences might be expected compared with a small lapse (i.e., acceptable drop), which involves a smaller decrease in activity (greater overall activity level compared to the larger lapse; see Figure 2.1).

Although an increase in the use of social control tactics was anticipated in a large lapse situation (i.e., deviant drop) where the child was assumed to be no longer receiving health benefits, factors associated with the development of norms for activity levels may relate to parent's use of social control. As mentioned previously, social control is closely associated with norms (Meier, 1982), and it may be expected that factors associated with the

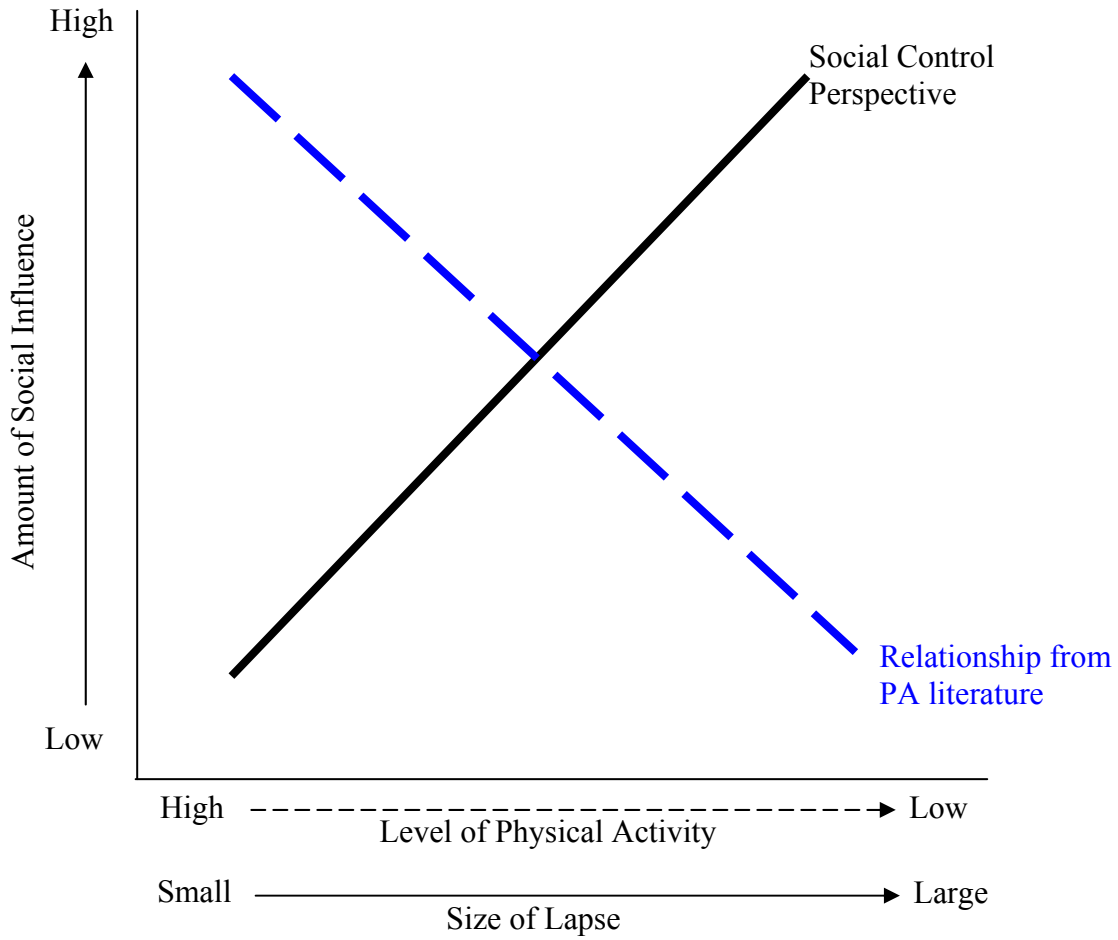

Figure 2.1 Expected Relationships between Social Influence and Physical Activity

development of norms for activity are potential moderators of parents' needs to regulate their child's behaviour through the use of social control. A variety of sources provide information for the formation of norms, including the individual's own behaviour and the observable behaviour of others (Miller & Prentice, 1996).

Indirect support for the role of parent activity as a possible moderator between a physical activity lapse and use of social control comes from research showing that less active parents tend to underestimate the amount of physical activity necessary for their child to gain health benefits (Cameron et al., 2005). This may suggest that a lower level of activity was perceived by low active parents as necessary to achieve the associated health benefits as compared with active parents. Further, as active parents reported using more social control than less active parents (Strachan et al., 2006), parent activity has the potential to serve as a moderator of the physical activity lapse - social control relationship. If active parents form a norm for their child being active, it might be expected that these active parents may try to regulate their child's activity more than less active parents by initiating greater use of control tactics when their child experiences a lapse in their physical activity.

A second possible moderator that might be related to social control is the child's physical activity level, as observable behaviours may be a source of information for forming norms (Miller & Prentice, 1996). As parents tend to view their child as 'active enough' (Morta & Queiros, 1996), parents of typically low active children may have lower expectations for their child's physical activity as compared with higher active children. If parents have lower expectations for the amount of physical activity that is required for their child to achieve health benefits, those parents may not exert social control in response to a physical activity lapse. These possible differences in expectations based on the child's physical activity level highlight the potential for child physical activity to serve as a moderator. With the possibility of both parent and child physical activity influencing the use of social control tactics, is there also a possibility of an interaction between these two variables? One interaction that may occur is as follows: An active parent with an active child would use the greatest amount of social control when faced with a lapse in the child's activity, with the activity level of both parties contributing to the norm for activity.

Based on the possibility of moderators influencing the lapse-social control relationship, a second purpose of the current study was to explore whether the child's and

parent's physical activity levels would be related to parent's perceptions of the use of social control following a lapse (deviant drop). It was hypothesized that reports of social control tactic use would be greater when the parent's and child's activity level were high, as the norm for the child to be physically active to achieve health benefits would be stronger. As it is unknown if, and how, parent's physical activity and the child's activity would interact, no hypotheses were made about the form the possible interactions between activity levels of parents and child would take, when predicting perceptions of social control use.

2.1 Methods

2.1.1 Participants

Adults (N = 160) who brought children to activity day camps or swimming lessons at a large University were recruited for this study. The sample included 103 mothers, 49 fathers, 2 grandparents and 6 adults who did not report their relationship. As the focus of this study was on parents' use of influences, the 8 individuals who could not be identified as parents were removed from further analysis. Owing to these deletions, as well as deletions for those with missing data (n = 8), the sample used for analyses was 144 parents. The average age of the children of these parents was 8.5 years (SD = 2.3 years; ranging from 2-16 years) with 47% (n = 67) girls and 53 % (n = 76) boys (missing: n =1).

2.1.2 Procedures

The University Ethics Committee approved this study (see Appendix A). Parents dropping their child off at a University day camp or watching their child participate in swimming lessons at the University were approached by the researcher and the purpose of the study was explained. Interested parents received a package that contained the consent form and questionnaire. They were asked to complete the package and return it to a drop box at the site of their child's program. For those who did not have time to complete the questionnaire (n = 12), the option was provided to take the questionnaire home and return it in a sealed envelope to the program instructor at the next session.

2.1.3 Measures

Lapse Scenarios. The questionnaire included two scenarios describing hypothetical lapses in physical activity (Appendix B), to which the parents responded. In both scenarios, the child was described as being physically active, and had been so for several years. In the acceptable drop scenario, the script outlined that the child's physical activity had dropped

from typical levels in the past two months, but the parent still perceived the child at a level that would result in health benefits. The deviant drop scenario outlined that the child's physical activity level had dropped to a level over the past two months where the parent was unhappy with this new level of activity, as the child was no longer active enough to be receiving health benefits. The description in both scenarios made it clear that the drop in activity was not due to anything obvious like sickness or injury, but was a new pattern of behaviour.

Using these scenarios, parents were asked how they would respond to each lapse in terms of the social control tactics they would use. The order of the scenarios was counter balanced such that half the parents completed questions concerning the acceptable drop scenario first and the other half completed the deviant drop scenario first.

Social Control Tactic Use. Thirteen tactics (see Table 2.1) taken from previous research with adolescents (Spink, 2003) and the social control literature for health behaviours (Lewis et al., 2004) were assessed. After reading each scenario, participants were presented with each tactic and asked 'How likely it is that they would perform the tactic as a means of increasing their child's physical activity?' Participants were asked to respond on a 7-point Likert scale (1=not at all likely to 7=very likely).

Perceptions of Control. After indicating whether they would use a tactic, participants were asked about whether they perceived themselves as using the tactic as a means of trying to control their child by asking whether they would be trying to 'persuade' their child to become more active (1=not at all to 7=very much so) for each tactic. While perceptions of control have a specific meaning in the social control literature, the idea of perceived control is not unique to this area. In other areas, perceived control is often described as the extent to which the behaviour is under the control of the individual attempting the behaviour (Armitage & Conner, 2000). One example of perceived control viewed in this way is perceived behavioural control, which is a key construct of the Theory of Planned Behaviour. Within the theory, perceived behavioural control reflects an individual's perception of the difficulty of performing a specific behaviour (Ajzen, 1991). Another construct framed as perceived control is self-efficacy, which describes an individual's confidence in his/her ability to perform a specific behaviour (Bandura, 1977), or perceptions about control based on internal factors (Armitage & Conner, 2001). As can be seen, these other constructs of

Table 2.1 Social Control Items

Tactics
Said that physical activity was good for the child
Gave encouragement
Provided financial support
Talked about physical activity being fun
Watched the child participate in physical activity
Nagged the child to be active
Ordered the child to be active
Urged the child to do physical activity
Participated in physical activity so that the child could see
Offered to be active with the child
Helped the child learn skills to be active
Said the child is good at physical activities
Rewarded the child for being active

control describe an individual's perceptions surrounding his/her own actions, which is in contrast to the perceptions of control employed in this study that capture another individual's attempt to control (i.e., regulate) the behaviour of someone else.

Below is an example of the series of questions used for the tactic of "urging" (See Appendix C):

How likely is it that you would *urge your child to do physical activity* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

Physical Activity. Parent's activity level was assessed using the Godin Leisure-Time Exercise Questionnaire (Godin & Shepard, 1985), with parents reporting their own typical physical activity behaviour (See Appendix D). In accordance with questionnaire instructions (Godin & Sheppard, 1985), parents were asked how many times on average they engaged in strenuous (heart beast rapidly), moderate (not exhausting), and mild (minimal effort) exercise for more than 10 minutes during their free time over a typical 7-day period. While the original version assessed typical number of bouts per week of strenuous, moderate, and mild intensity exercise of greater than 15-minutes duration, the version used here was modified slightly to capture bouts lasting at least 10 minutes. This change in time period was made to reflect recommendations in *Canada's Physical Activity Guide* (Health Canada, 1998), which states that health benefits can be accrued in bouts of activity lasting at least 10 minutes. The second item in the questionnaire asking about the frequency of engaging in activity long enough to work up a sweat was not asked in this study. To calculate leisure-time activity, the weekly frequencies of strenuous and moderate activities were multiplied by 9 and 5 METs, respectively. Total weekly leisure activity was calculated by summing the products of the two intensities. For this study, only the frequency of moderate and strenuous physical activity were used as moderate intensity or greater have been associated with health benefits of physical activity (Warburton et al., 2006).

Godin and Shepard (1985) provided support for the validity of this self-report measure through comparisons with body fatness and maximum oxygen uptake. A two week

test-retest of the Godin Leisure-Time Exercise Questionnaire showed acceptable reliability (r =.80; Godin & Shepard, 1985). Other researchers have found support for the instrument's reliability through a one month test-retest (r = 0.64) and validity through comparison with cardiovascular fitness (r = 0.57), body fatness (r = -0.43), and maximum oxygen uptake (r =.56; Jacobs, Ainsworth, Hartman, & Leon, 1993).

Child's typical physical activity was reported using a Godin Leisure-Time Exercise Questionnaire (Godin & Shepard, 1985; Jacobs et al., 1993), as reported by their parents. The questionnaire was modified so that parents were asked to report on their child's typical physical activity (See Appendix D). As was the case with parent activity, only the frequency of moderate and strenuous physical activity over a typical seven-day period was used for the child's activity.

2.1.4 Analysis Plan

An exploratory factor analysis (principal components analysis with oblique rotation) was used to reduce the number of tactics. It was anticipated that there would be a relationship between the different factor groupings of tactics used by parents, hence the need for using an oblique rotation. As other studies have grouped factors into types such as positive and negative tactics (Lewis & Butterfield, 2005), a factor analysis also helped to identify if there were any patterns of correlations among the present tactics, and if tactics might be able to be grouped meaningfully. Combining tactics meaningfully also helped reduce the number of analyses performed in this study.

2.1.4.1 Main Analysis

As this study was exploratory in nature, a liberal alpha ($\alpha = .1$) was selected to reduce the possibility of a Type II error (B. D. Franks & Huck, 1986). To assess the first hypothesis that parents would use more social control in response to a deviant drop scenario compared with an acceptable drop scenario, a MANOVA was conducted with the scenario (acceptable versus deviant drop) as the independent variable and the groups of tactics emerging from the factor analysis as the dependent variables. If necessary, follow-up univariate tests would be conducted to identify which groups of tactics were different between scenarios. To address the second hypothesis that increased levels of parent and child physical activity would be associated with increased perceptions of control, separate hierarchical regressions for the perceptions of control of each group of tactics resulting from the factor analysis were

conducted. Parent's physical activity and child's physical activity were centered and entered on the first step. The interaction term of the two centered predictors (i.e., parent and child activity) was added on the second step.

2.2 Results

2.2.1 Exploratory Factor Analysis

Results from the principal components analysis revealed four factors emerging with eigenvalues greater than 1.0 (see Table 2.2). The selected solution accounted for 62.8% of the variance in the items. Based on the pattern matrix, items were evaluated as loading on a factor by using a combination of values greater than .32 (Tabachnick & Fidell, 2001) and a gap in the loading of items on a particular factor (Tabachnick & Fidell, 2001). Two items were excluded from the interpretation. 'Watching the child' had two loadings of at least .32 and, as such, was identified as cross-loading. For the second factor containing the items order, nag, and urge, a large gap was seen in the item loadings (.907 to .465), and the item at the bottom edge of that gap was excluded (urge), as its loading appeared to not match with the other items loading on that factor.

The first factor included four items that related to the more positive forms of control including: a) discussing that physical activity is good for the child, b) providing encouragement, c) providing financial support, and d) talking about how much fun physical activities are (see Table 2.2 for loadings). This factor was labelled positive social control. The second factor included two items that often have been grouped into negative forms of social control and included the items: nagged the child to be active and ordered the child to be active. This factor was labelled negative social control. The third factor labelled collaborative social control involved actions on the part of the parent that involved some type of collaboration with the child. The three items on this factor included: a) participating in physical activities so that the child could see, b) offering to be active with the child, and c) helping the child learn the skills to active. The final factor included two items that pertained to the parent providing reinforcement to the child either in the form of rewarding the child for performing physical activities or telling the child that they are good at the physical activities they do. This final factor was labelled rewarding social control.

Table 2.2 Factor Loading Matrix of Social Influence Items

	1	2	3	4
Said that physical activity was good for the child	.818	.178	.021	-.224
Gave encouragement	.694	-.033	-.142	.052
Provided financial support	.668	-.107	.073	.095
Talked about physical activity being fun	.564	.163	-.153	.022
*Watched the child participate in physical activity	.395	-.108	-.214	.347
Nagged the child to be active	-.081	.909	.028	-.095
Ordered the child to be active	.035	.907	-.011	-.095
*Urged the child to do physical activity	.251	.465	-.034	.212
Participated in physical activity so that the child could see	-.181	.038	-.951	-.010
Offered to be active with the child	.092	-.036	-.853	-.048
Helped the child learn skills to be active	.163	-.033	-.711	.021
Said the child is good at physical activities	-.023	-.083	.066	.834
Rewarded the child for being active	-.008	.266	-.059	.627
Eigenvalue	4.05	1.84	1.22	1.05
Rotated SSL	3.09	2.29	2.94	1.73

* Items that were identified as cross-loading and dropped from subsequent analysis

Some of the factors were correlated with each other, which further supports the use of the oblique rotation (Tabachnick & Fidell, 2001). The largest correlations were between positive and collaborative social control (r = .49 - .52), and to a lesser extent between positive and rewarding social control (r = .31 - .36). The smallest correlations were between negative and collaborative social control (r = .07 - .09). Table 2.3 contains a correlation matrix for the various factors along with the average Cronbach's (1951) alphas. Positive, negative, and collaborative social control all had acceptable alphas greater than .7 (Nunnally & Bernstein, 1994), so were retained in future analyses. The alpha for the fourth factor (rewarding social control) was considered too low (average alpha = .37), so was removed from further analyses.

2.2.2 Main Analysis

Prior to conducting the main analysis, the groups of tactics reflecting use (i.e., positive, negative, and collaborative) were screened for normality and outliers using boxplots, histograms and standardized scores. Although positive and collaborative social control were negatively skewed ($z_{skew} > 3.29$), the MANOVA technique is robust to these violations of normality (Tabachnick & Fidell, 2001), and no transformations were performed. Outliers were examined and three cases were identified with a standardized score greater than 3.29 on at least one of the groups of tactics and, as such, were removed from the MANOVA analysis, leaving a sample of 141.

To assess differences in the social control used in the acceptable versus deviant drop scenarios, a MANOVA was performed[1]. The overall MANOVA was significant, $\Lambda = .79$, $F(3,138) = 12.60$, $p < .001$. Results from the follow-up univariate tests revealed significant differences between the acceptable and deviant drop scenarios for positive social control, $F(1,140) = 5.48$, $p < .05$ (minimal effect size, $\omega^2 = .003$), negative social control, $F(1,140) = 7.60$, $p < .01$ (minimal effect size, $\omega^2 = .003$), and collaborative social control, $F(1,140) = 35.48$, $p < .001$, (small effect size, $\omega^2 = .028$). As expected, more control was used by parents in the deviant drop scenario than the acceptable drop scenario for all three groups of tactics (see Table 2.4).

[1] To evaluate a possible order effect of the scenarios, the MANOVA was re-run including scenario order as a main effect, and was found to be not significant, $\Lambda = .99$, $F(3,137) = .08$, $p > .1$.

Table 2.3 Correlations among Control Factors (acceptable drop above the diagonal and deviant drop below the diagonal) and Average Cronbach's Alpha Values (along the diagonal)

	1	2	3	4
1. Positive Social Control	*.73*	.27	.52	.36
2. Negative Social Control	.22	*.83*	.07	.27
3. Collaborative Social Control	.49	.09	*.80*	.28
4. Reward Social Control	.31	.20	.18	*.37*

Table 2.4 Descriptive Statistics for Social Control by Scenario

Tactics	Acceptable Drop Mean (SD)	Deviant Drop Mean (SD)
Positive Social Control**	6.52 (.57)	6.59 (.55)
Negative Social Control***	3.31 (1.76)	3.54 (1.88)
Collaborative Social Control***	6.21 (.88)	6.48 (.71)

** $p < .05$
*** $p < .01$

Note: All items were assessed on a 1 (*not at all likely*) to 7 (*very likely*) scale

Hierarchical multiple regressions for each group of tactics (i.e., positive, negative, collaborative) were used to address the second purpose. Prior to running these hierarchical multiple regressions, the independent variables were screened for outliers and normality using histograms, boxplots, and standardized scores. For parental activity, z-scores greater than 3.15 were removed ($n = 2$) and for child's activity, z-scores greater than 3.2 were removed ($n = 3$), with one individual being identified as an outlier based on both parent and child activity.[2] Mahalanobis distance was used to detect the presence of multivariate outliers. No additional participants were identified as multivariate outliers. Each of the dependent variables was examined for outliers using a similar procedure and no outliers were identified. Further, participants were dropped from the analysis due to missing data bringing the final sample to 128. Following removal of outliers, both parental and child activity were assessed for normality, with both variables appearing to approximate a normal distribution after an inspection of standardized skewness and kurtosis values. An inspection of the correlation coefficients and collinearity diagnostics revealed that the centered activity variables and their interaction did not demonstrate multicollinearity.

2.2.3 Perceptions of Control

In terms of positive social control, the first step of the regression predicting perceptions of control using parent and child activity was significant, $F\,(2,125) = 3.04$, $p < .05$, with parent and child activity accounting for 4.6% of the variance in perceptions of positive social control (Table 2.5). An inspection of the regression coefficients revealed that only parent physical activity ($b = .01$ ($SE = .006$), $p < .1$) predicted the perceptions of positive social control. The addition of the interaction between parent and child physical activity was not significant, $F_{\Delta}\,(1,124) = .85$, $p > .1$.

Examination of the residual plot suggested that normality of the dependent variable may have been violated with positive social control being negatively skewed. An additional analysis was performed using the rank of responses on positive social control to assess whether using a transformation would be appropriate (J. Cohen, Cohen, West, & Aiken, 2003). Given the continued non-normal distribution following transformation, difficulty in

[2] As standardized scores, histograms, and boxplots were used to examine physical activity for outliers, the cutpoints represented by the standardized scores of parent and child physical activity were different as individuals with standardized scores below the traditional 3.29 (Tabachnick & Fidell, 2001) were separated from the rest of the distribution based on inspection of boxplots and histograms.

Table 2.5 Predicting Perceptions of Control: Summary of Regressions

Tactic	Step	Predictor	R^2	R^2_{Δ}	F_{Δ}	$F_{overall}$	Unstandardized Coefficients (SE)
Positive	1[a]		.046			3.04**	
		Parent PA					.01 (.006)*
		Child PA					.007 (.005)
	2[b]		.053	.006	.85	2.31*	
Negative[†]	1[a]		.005			.31	
	2[b]		.049	.044	5.78**	2.14*	
		Parent PA					.004 (.008)
		Child PA					.000 (.007)
		Interaction					-.001 (.000)**
Collaborative	1[a]		.04			2.61*	
		Parent PA					.01 (.006) *
		Child PA					.006 (.005)
	2[b]		.046	.006	.74	1.98	

* $p < .1$
** $p < .05$

[†] See Table 2.6 & Figure 2.2 for the results of simple slopes analysis for negative SC

[a] Step 1 predictors: Parent physical activity (centered), Child physical activity (centered)

[b] Step 2 predictors: Parent physical activity (centered), Child physical activity (centered), Parent physical activity x Child physical activity interaction

interpretation, and similar results with ranked data, the decision was made to remain with the non-transformed variable for ease of interpretation.

A second regression predicting perceptions of control when using collaborative social control was performed. The first step examining the main effects for parent and child activity was significant, F (2,125) = 2.61, $p < .1$, accounting for 4.0% of the variance in perceptions of collaborative social control (see Table 2.5). An inspection of the regression coefficients revealed that increases in parent physical activity (b = .01 (SE = .006), $p < .1$) was related to increases in perceptions of control for collaborative social control. The interaction of parent and child activity did not add to the prediction of perceptions of control, F_{Δ} (1,124) = .74, $p > .1$. Inspection of the residual plots showed slight violation from normality so the regression was repeated using ranked scores and similar results were obtained, and as such, it was decided that the original analysis would be retained.

The first step predicting perceptions of control for negative social control was not significant, F (2,125) = .31, $p > .1$ (see Table 2.5). However, the interaction did significantly add to the prediction, by explaining an additional 4.4% of the variance, F_{Δ} (1,124) = 5.78, $p < .05$. Figure 2.2 contains a visual representation of this interaction. Inspection of the simple slopes (Table 2.6) revealed that when the child's activity was low (one standard deviation below the mean), increased parent activity (b = .021 (SE = .01), $p < .05$) was associated with increased perceptions of control. In addition, when parent activity was low (one standard deviation below the mean), higher levels of child activity (b = .015 (SE = .009), $p < .1$) were associated with increased perceptions of control (see Figure 2.3). Inspection of the residual plots for this analysis showed that the assumptions appeared to be met.

2.3 Discussion

As the study of physical activity lapses has received little attention in the literature, the focus for this study was to explore whether a lapse in a child's activity would influence the social influences that parents use, as informed by a social control framework. This study explored both the use of social control and perceptions of control.

The first purpose of this study was to explore how a health-related physical activity lapse in children was related to the use of social control tactics by parents. The hypothesis was supported as parents reported a greater use of social control tactics when presented with a larger lapse (deviant drop) where the child was not receiving health benefits in contrast to a

Table 2.6 Simple Slope Analysis for Perception of Control for Negative Social Control

	Unstandardized coefficient (SE)	T
Low Child PA (1 SD below) Parent PA	.021 (.01)	2.00**
High Child PA (1 SD above) Parent PA	-.013 (.01)	-1.17
Low Parent PA (1 SD below) Child PA	.015 (.009)	1.73*
High Parent PA (1 SD above) Child Pa	-.015 (.01)	-1.48

* $p < .1$
** $p < .05$

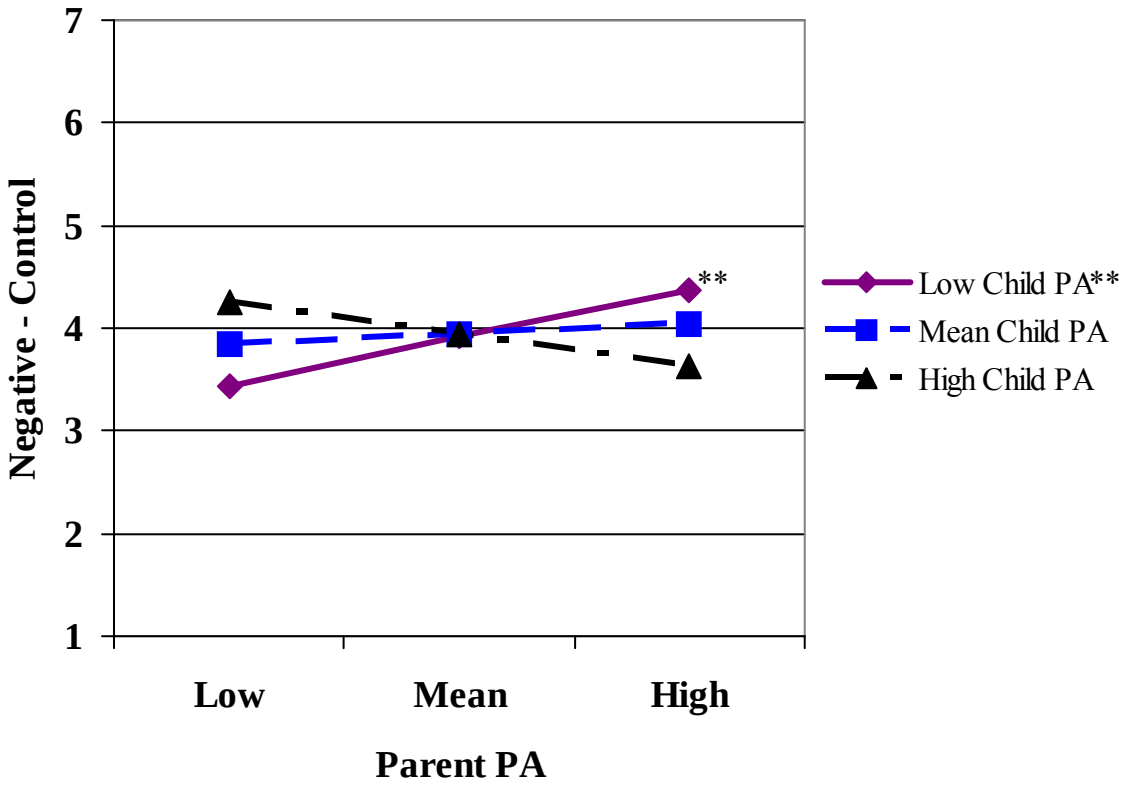

Figure 2.2 Interaction for Perceptions of Control for Negative Social Control – Low Child Physical Activity (**p <.05)

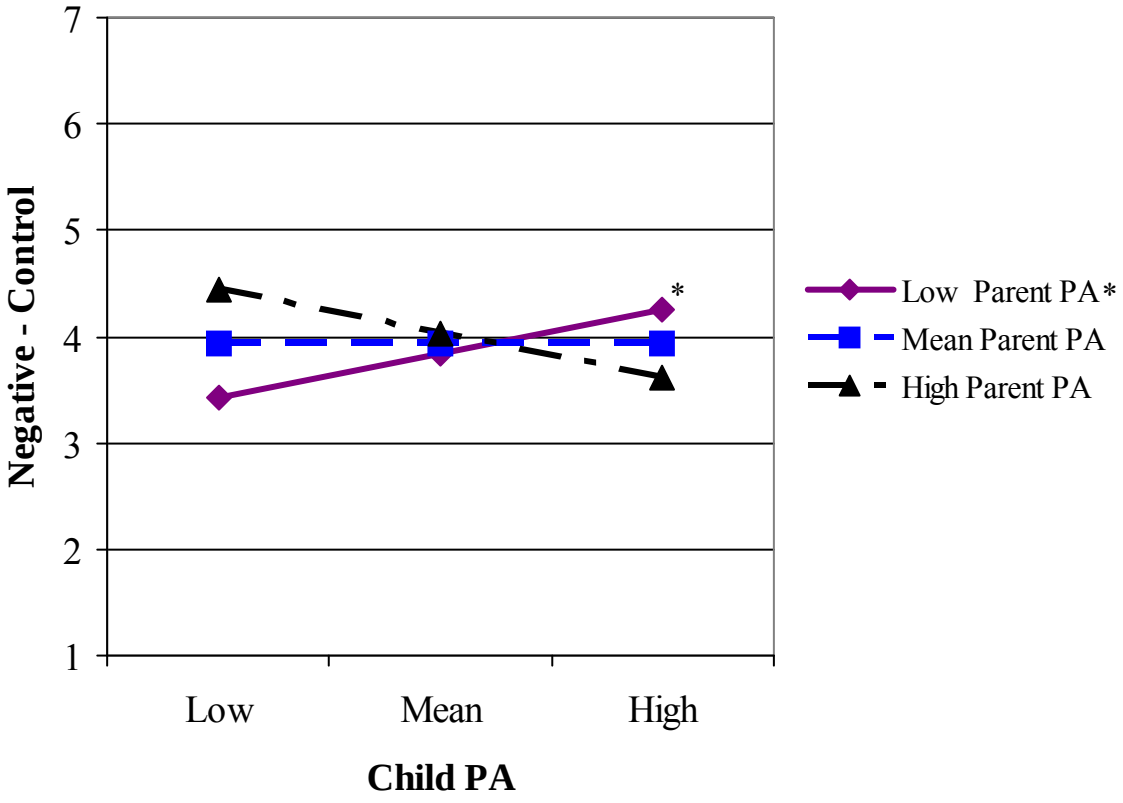

Figure 2.3 Interaction for Perceptions of Control for Negative Social Control – Low Parent Physical Activity (*$p < .1$)

smaller lapse (acceptable drop) where the child was still achieving health benefits. This finding is consistent with research examining university students in another health setting, which demonstrated that when individuals perceived unhealthy behaviour in their significant others, they used more social control (Lewis & Butterfield, 2005). The finding of a difference between scenarios in this study provides some support for the idea that physical activity may be normative for health (Umberson, 1987) in that when children were perceived as violating the norm for this health-related behaviour (e.g., a lapse), parents used social control tactics in an attempt to regulate activity behaviour.

It is worth noting that the increased use of the social control tactics in the large lapse scenario compared to the small lapse scenario is contrary to what the general physical activity literature would suggest when physical activity decreases. A number of studies in the literature would suggest that a positive relationship exists between social influence and physical activity (Hohepa et al., 2007; Pugliese & Tinsley, 2007; Sallis et al., 2000). As such, the lower levels of activity linked with a lapse should be associated with lower levels of social influence. As this was not the case in this study, support for the idea that lapses may be associated with some type of regulatory influence starts to emerge.

While the physical activity literature, for the most part, has not focussed on lapses, adolescents experiencing a lapse are likely included in many of the cross-sectional studies reported in the literature. Given that several studies have failed to find a relationship between parental influences and physical activity (Duncan et al., 2005; Prochaska, Rodgers, & Sallis, 2002), it may be possible that the results from the inadvertent inclusion of lapsers into the samples examined may be a confound and serve to nullify the typical relationship. For example, if a positive relationship is seen for those who are maintaining or increasing their activity, but lapsers exhibit a negative relationship, as was demonstrated in this study, including both in the same analysis may serve to cancel each other out, resulting in either no relationship or a weaker positive relationship. As such, it may be important to consider individual's previous activity pattern when trying to understand the relationship between social influences and physical activity behaviour.

While the results from this study suggested that parents used social control in response to physical activity lapses, the trigger of that lapse remains unclear as the scenarios used in this study differed both in size of lapse (small versus large) as well as in violation of

health expectations. As Lewis and Butterfield (2005) reported that it was severity of consequences rather than behaviour frequency that was important in individuals attempting to regulate their partner's behaviour, it might be speculated that it was the violation of the norm for being active enough for health that triggered parents to use social control. With that being said, the two possibilities (i.e., size and expectation violation) also may work in tandem with the larger lapses being necessary for the parent to realize that their child is no longer achieving health benefits. Examining whether it was lapse size, violation of the activity norm for health, or both that contributed to the differences found in this study requires future research.

The second purpose of this study was to explore whether parent's perceived use of social control tactics as control would be moderated by parent and child activity levels. The second hypothesis that perceptions of control would be associated with higher levels of parent activity and child activity received partial support. While parent activity was related to perceptions of control for positive and collaborative social control supporting the hypothesis, child activity was not related to perceptions of control for positive and collaborative social control, contrary to the hypothesis.

Although it was expected that both parent and child activity would be sources of information for the formation of activity norms (Miller & Prentice, 1996), it appears as if only parent physical activity was important in this study. One possible explanation for this unexpected finding may be based on the idea that when norms are of central value to the enforcers, they are more likely to be implemented (Feldman, 1984). In the case of parents' norms for their child's activity, it may be that norms formed around the parents' own behaviour hold more value for the parent than those formed around the child's behaviour.

Another possible reason for child activity not emerging as a predictor may be that the description of the lapse scenarios included information describing the child's level of activity. For example, each scenario described the child as being active 16 times per month for several years prior to the lapse. With this initial level of activity prescribed by the scenario, it may have served to minimize the role of the child's activity level, as parents may have combined this information with their child's own typical activity level when evaluating the norm for their child's physical activity.

Given the suggestion in other studies that parental activity influences child activity indirectly through other social mechanisms (Gustafson & Rhodes, 2006; Sabiston & Crocker, 2008; Trost et al., 2003), the findings from this study that parent activity was important is not surprising. For example, high active mothers reported offering to be active with their child and watching their child more often than low active mothers (Strachan et al., 2006). As social control is exerted when expectations are violated (Lewis & Butterfield, 2005), it might be expected that parent activity predicts perceptions of control given that active and less active parents likely differ in their views of the physical activity necessary for health benefits (Cameron et al., 2005). Additionally, the fact that parent activity was related to collaborative social control also has some intuitive appeal, as those active individuals may have greater opportunity to utilize tactics such as participating so the child can see and offering to be active with the child than a less active parent.

The fact that parent physical activity was the best predictor of parents' perceptions of control suggests that active parents are the ones who may form a norm surrounding the level of activity required for their child to achieve health benefits. As social control is thought to be a reaction to a violation of a norm (Clark & Gibbs, 1965), and health-related social control a reaction to a health threat (Lewis & Butterfield, 2005), it is the active parents who form this norm and are the ones most likely to use social control. It might be posited that less active parents, on the other hand, have not internalized the norm for their child to be active and would not respond to a lapse in their child's physical activity.

Negative social control (e.g., order and nag) appeared to have a unique relationship with parent and child activity, in that it was the interaction that predicted perceptions of control. For children whose physical activity was typically lower, more active parents perceived using more control than less active parents. Although unexpected, a possible explanation for these findings may be due to perceived difficulty of the change. When providers of the social control perceive the behaviour as more difficult to change, they report using more negative social control (Butterfield & Lewis, 2002). This might be the case in the present study as active parents may have perceived it to be more difficult for low active children to increase their activity to an acceptable standard as they were starting at a lower level.

As social control has not been examined in the parent-child relationship, and has received limited attention with physical activity behaviour, the measure of social control used in this study deserves a comment. Tactics used in this study were gleaned from the social control (Lewis et al., 2004) and physical activity (Spink, 2003) literature, and these tactics were grouped into three types (i.e., positive, negative, collaborative) based on an exploratory factor analysis.

Both positive and negative tactics are common in the social control literature (Lewis & Butterfield, 2005; Lewis et al., 2004), so it may not be surprising that both emerged in this study. Negative tactics are typically described as inducing guilt in the target or are an expression of disapproval (Lewis & Butterfield, 2005), and are sometimes viewed as the 'pressuring' tactics (Fekete et al., 2006). Both nagging and ordering the child were labelled as negative tactics in this study as they both seem to be 'pressuring' tactics and were similar to other tactics identified as negative by Lewis and Butterfield (2005).

Positive strategies include tactics that reflect the agent of control attempting to persuade, discuss, or model the behaviour (Lewis & Butterfield, 2005), and are sometimes described as the 'encouraging' tactics (Fekete et al., 2006). Emerging from the definition, it is not surprising that encouragement grouped with the positive tactics. Both telling the child that physical activities are good for them and are fun seem to be examples of discussing the behaviour with the child. As financial support is often necessary to participate in organized activities, this tactic might be related to the positive tactic of helping someone perform the desired behaviour.

Although the collaborative tactics (i.e., offer to be active with, help child learn skills, and participate so child can see) may be seen as positive forms of control (Lewis & Butterfield, 2005), they loaded separately from the other positive tactics suggesting that parents viewed them differently. One possible explanation for the distinctiveness of these tactics may be the type of behaviour examined. For example, physical activity is a health behaviour that is often done as a family as opposed to other health behaviours such as smoking, which are quite individual. Given that previous studies (Lewis & Butterfield, 2005; Lewis et al., 2004) using a similar measure typically have examined several health behaviours at once, it is possible that the 'collaborative' form of control is unique to physical activity behaviours. Another unique aspect of the three tactics that loaded on the

collaborative factor may be that these tactics rely on an action on the part of the child (i.e., accepting the offer by the parent to be active with them). With this action required on the part of the child, these tactics may represent a more collaborative approach where both parties take shared responsibility for the behaviour change (Meichenbaum & Turk, 1987).

This study has a number of strengths that should be highlighted. First, one area that has received limited attention in the physical activity literature is the examination of lapses. One strength of this study was the examination of the influences that may follow a lapse. An understanding of the social influences that occur following a lapse such as social control may help in the understanding and design of interventions to help adolescents recover from lapses (Bouton, 2000). With little existing research on adolescents who experience an activity lapse (Shields et al., 2008) available, this study provides further support for the importance of examining lapses on their own.

A second strength of this study involves evaluating whether parents use social control in response to a lapse. As the emphasis in the physical activity literature has been on social support (Duncan et al., 2007; Heitzler, Martin, Duke, & Huhman, 2006; Hohepa et al., 2007), this study borrowed a construct (e.g., social control) from other health areas (Lewis & Butterfield, 2005; Westmaas et al., 2002) to address a specific issue in the physical activity literature (e.g., physical activity lapses). By describing an acceptable lapse or a deviant lapse in two scenarios, this study was able to compare the use of social control in two situations: one where social control was expected to be used and one where it was not expected.

Another strength of this study was the consideration of the parents' perceptions of control. Although social control and social support have been reported to be distinct constructs (Helgeson et al., 2004; Lewis et al., 2004), it is worth noting that the same social influence tactics are sometimes used to describe both support and control. For example, encouragement has been used to describe both social support (e.g., Duncan et al., 2005) and social control (e.g., Lewis et al., 2004). Given that the same items have been used as both support and control, a strength of this study was allowing the parents to specify their intentions of control rather than relying on the researcher's views of whether various tactics were social control. By examining perceptions of control, it showed that parent activity, a proxy for norms for physical activity, was associated with increased perceptions of control, specifically with collaborative and positive tactics.

While most of the extant social control literature has focused on spousal relationships, another strength of this study was the extension into the parent-child relationship. This is important as parents are viewed as responsible for transmitting health behaviours to their children (Dishion & McMahon, 1998), and as such, may use social control frequently. Peers are often considered a strong influence on older children and adolescent behaviour (Beets, Vogel, Forlaw, Pitetti, & Cardinal, 2006; Duncan et al., 2005). However, with the emphasis on peers, less research has focused on the potential for parents to influence their child's behaviour. As suggested by Pugliese and colleagues (2007), parents still play a role in adolescent's behaviour, highlighting the need to continue examining the role of parents in influencing their children's activity behaviour.

While the study had a number of strengths, it was not without its limitations. First, this study relied on hypothetical scenarios to manipulate whether parents perceived a lapse or not. While hypothetical scenarios allow for the study of constructs that may otherwise be difficult to examine (Finch, 1987), they are limited in terms of their ecological validity (Lanza, 1990). One way to increase the ecological validity of these hypothetical scenarios would be to increase the correspondence between what parents report they would use and their actual use. As such, future research might consider making the scenarios more relevant to the reader to enhance this translation. For example, to provide some control, the present scenarios described the child's physical activity at a set level. However, having the parent reflect on their own child's physical activity level might make the scenario more personally relevant. Additionally, using qualitative research to help formulate future scenarios might prove beneficial. Future research also could attempt to replicate the findings from the present study using actual physical activity lapses.

A second limitation of this study was that the parents' norm for their child's physical activity behaviour was not directly assessed. Parent and child activity were selected as possible moderators because of their potential to be a source of information used in the formation of the parents' norm for their child's behaviour (Miller & Prentice, 1996). However, whether or not being active translates into a norm that activity is necessary for health was not evaluated. With the emphasis on norms, and social control as a reaction to violations of norms (Clark & Gibbs, 1965), examining the parent's norms and factors that contribute to its formation would be beneficial.

Although the findings from this study provided general support for parent's use of social control following a lapse, and the importance of parent's physical activity in predicting perceptions of control, it is important to note that the effect sizes were minimal to small. These small effect sizes suggest that other factors may be important in understanding how parents respond to a physical activity lapse in terms of their use of social control. As mentioned above, examining the parents' norm for their child's physical activity may be beneficial in furthering our understanding of their use of social control. Another possible factor to consider may be the perceived difficulty of the change, as difficulty has been related to the types of social control used for general health behaviours (Butterfield & Lewis, 2002). It may be that parents would use different types of control if they perceived recovering from a physical activity lapse as more difficult. Future research is needed to explore other factors that may influence both parents' use of social control following a lapse and their perceptions of control.

As this study examined factors that predicted and moderated the use of social control by parents, further research is necessary to evaluate the reactions or consequences of the parental social control. With the initial intent of this study to understand the influences that occur following a physical activity lapse, studies understanding whether these influences are effective in prompting the child to return to being active and maintaining a healthy lifestyle are needed.

With these future directions in mind, Study 2 looked to replicate and extend the research conducted in Study 1. Similar to Study 1, Study 2 explored how social control was used by parents in response to a lapse and the role parent and child activity may play in its use. The results from Study 1 were extended in several ways. First, Study 2 builds on the previous study by taking the adolescent perspective as opposed to the parent perspective that was used in Study 1. A second extension involves replicating the results in the real world by following adolescents over time. By prospectively following adolescents over the period of a year, the changes in social control and behaviour over time can be investigated.

CHAPTER 3

STUDY 2: FAMILY SOCIAL CONTROL RESPONSES FOLLOWING A PHYSICAL ACTIVITY LAPSE: ADOLESCENT'S PERSPECTIVE

One of the key features of the social control definition involves the behavioural reaction to deviance (Clark & Gibbs, 1965). With the exception of the results from Study 1, and those of Lewis and Butterfield (2005), it is surprising that social control as an outcome of behaviour deviance has not received much attention in the health-related social control literature. While the two studies that have explored social control as an outcome (Lewis & Butterfield, 2005; Study 1) examined different behaviours, both used hypothetical scenarios and involved the provider of the social control reporting the social control they would use following a hypothetical lapse.

Although hypothetical scenarios are useful for describing complex situations that may be difficult to otherwise evaluate (Finch, 1987), hypothetical scenarios are limited in the ability to generalize to real-life situations (Lanza, 1990). Further, the correspondence between intentions in response to hypothetical scenarios and actual response in the same situation is largely unknown (Finch, 1987). To address this latter point, as well to increase ecological validity, the present study attempted to replicate and extend the findings from Study 1 by examining the relationship between actual lapses in self-reported physical activity and adolescents' reports of the social control used by their parents.

Based on the definition of social control posited by Clark and Gibbs (1965), when an individual experiences a physical activity lapse (e.g., deviates from the norm), one would expect social control to increase (i.e., a negative relationship). As social control has been conceptualized as an influence designed to regulate unhealthy behaviour (Lewis & Butterfield, 2005; Markey et al., 2008), the expectation would be that increases in social control would lead to subsequent increases in physical activity (i.e., a positive relationship). However, using a cross-sectional design, it is possible that the relationship between social control and physical activity could be either negative, as it may increase in response to a decrease in a desired behaviour, or positive due to the regulating component of social control.

Several studies have examined social control prospectively (e.g., Fekete et al., 2006; Helgeson et al., 2004); however, as mentioned in the general introduction, the focus in these studies has been on social control predicting future behaviour rather than on how changes in behaviour might relate to the use of social control. The paucity of research examining how changes in behaviour lead to the subsequent use of social control highlights the need to examine this relationship using a longitudinal design. To address this suggestion, the current study prospectively examined the relationships between lapses in activity behaviour and use of social control to detect whether changes would occur over time in the expected direction.

Given the dyadic relationship between the dispensing and the receipt of social control, the examination of the adolescent's perspective on the use of social control also becomes important. In both of the previous studies examining social control as the outcome (Lewis & Butterfield, 2005; Study 1), the provider of the social control was used as the unit of analysis. This need to examine the responses of the recipient of the social control influence has been demonstrated in one previous study examining how attitudes and behaviours are transmitted from one generation to another (Wood Baker, Whisman, & Brownell, 2000). In that study, college students' perceptions of their parents' attitudes and behaviours were related, but not identical to their parents' report. Further, Wood Baker and colleagues (2000) showed that the students' perceptions of their parents' attitude and behaviour were a better predictor of the students' attitudes and behaviour than the parents' report of their own attitudes and behaviour. This leads to the first purpose of this study, which was to explore adolescents' perceptions of family social control use following a self-reported physical activity lapse.

When considering social control changes following a lapse in physical activity, it is important to consider other factors that might play a role in the use of social control. For example, Lewis and Butterfield (2005) examined severity of health consequences, types of behaviour, and behaviour frequency as predictors of social control use. Two possible moderators identified in Study 1 included the parent's and child's typical physical activity levels. Use of these two activity-linked moderators was based on the premise that both may be sources of information for the development of norms (Miller & Prentice, 1996). Results from Study 1 revealed that parent physical activity predicted perceptions of control for

positive and collaborative social control while the interaction between parent and child activity was important for negative social control.

Hypotheses for the current study were based on these findings from Study 1. First, it was hypothesized that following a self-reported lapse in physical activity, adolescent reports of the use of social control tactics by parents (positive and collaborative social control) would increase more in those with more active families compared with less active families. For negative social control, it was predicted that parents' use of negative social control following a lapse as reported by adolescents would be greatest when adolescent physical activity was typically low and family activity was reported as high.

While research has examined the relationship between social control and subsequent behaviour change, the expected relationship has not been found consistently. Several studies have found that social control had a positive effect, and was associated with improved behaviour (Lewis & Butterfield, 2005; Lewis & Rook, 1999; Tucker, 2002; Umberson, 1992; Westmaas et al., 2002), while others have reported that social control was associated with no change or poorer health behaviour (M. M. Franks et al., 2006; Helgeson et al., 2004; Lewis & Rook, 1999). With these mixed results, a secondary purpose of this study was to explore whether changes in social control would be associated with behaviour change (i.e., between those who returned to being more active following a lapse compared to those who remained less active).

3.1 Method

3.1.1 Participants

Adolescents from the *in motion* prospective study ($N = 547$) were used for this study. This study followed adolescents over a 12-month period. Participants were high school students in grades 9 to 12 ($n_{gr.9} = 169$, 31%; $n_{gr.10} = 150$, 27%; $n_{gr.11} = 109$, 20%; $n_{gr.12} = 117$, 21%). The participants ranged in age from 13 to 18 years, with a mean age of 16.2 years ($SD = 1.22$). The distribution by sex was approximately equal with 52.5% ($n = 264$) being girls and 47.5% ($n = 239$) boys.

3.1.2 Procedures

Ethical approval for this study was obtained by the University Ethics Committee and the School Board Ethics Review prior to data collection. Both parental consent and participant assent were obtained. Participants from two high schools in two cities in

Saskatchewan completed a questionnaire 6 times throughout the year at two month intervals (September, November, January, March, May, and September). Participants completed the questionnaires independently in a classroom.

3.1.3 Measures

Physical Activity. Physical activity was assessed using the Modified Activity Questionnaire for Adolescents (MAQ-A, Kriska et al., 1990). In the current study, participants were asked to report their physical activities over the last four weeks. Participants were asked to indicate the number of sessions per week and average number of minutes per session they had participated in each of 36 listed activities over the last month (space also was provided for participants to identify additional activities, if necessary; see Appendix E). For each activity, the level of energy expended was calculated in kilocalories per kilogram per day (KKD). These values were then summed to provide an indication of participant's overall level of energy expenditure in KKD. The MAQ-A has been demonstrated to be a reliable and valid measure of physical activity expenditure for use with youth and adolescents (Aaron et al., 1995).

The calculated physical activity levels were then used to identify individuals who had lapsed (described below under Analysis Plan). As well, an average level of physical activity prior to a lapse was calculated and used to represent the adolescent's average activity level.

Social Control. Family social control was assessed using seven items that were based on previous work with similar youth responding to open-ended questions (Spink, 2003). An attempt was made to use tactics that were used in Study 1, whenever possible. Items also were grouped into the same factors that were found in Study 1 (i.e., positive, negative, and collaborative SC tactics). For positive social control, the same four positive tactics from Study 1 were assessed in the *in motion* study (e.g., give you encouragement, say that physical activity was good for you, talk to you about how much fun physical activity is, and provide financial support), and as such, were grouped together for use in this study. Two of the three collaborative social control items from Study 1 (e.g., help you learn the skills that you use in being active, and offer to be active with you) were assessed in the *in motion* study and were used to represent collaborative social control in this study. As nagging social control was not assessed in the *in motion* study, the single item of ordering that was assessed in the *in motion* study was used to represent negative social control. An example of a question for positive

social control was: “In the past month, how often did any of your family members say that physical activity was good for you?” Participants responded on a 1-5 Likert scale ranging from 1=never to 5=very often (see Appendix F for questions).

Family Physical Activity. Family physical activity was not directly assessed as part of the *in motion* prospective study. However, participants were asked to indicate how often they saw any of their family members (mother, father, brothers, sisters, grandparents) participate in physical activity, and this item was used to reflect their family’s physical activity level. Participants responded to this item on a 1-5 Likert scale (1=never to 5=very often; see Appendix F). The average rating on this item across the time points prior to the adolescent’s lapse was used to represent the family’s typical physical activity level.

3.1.4 Analysis Plan

Cronbach’s (1951) alphas were used to assess if the grouping of social control items into three types as was done in Study 1 (i.e., positive, collaborative, and negative) would demonstrate adequate internal consistency. The first purpose of exploring the changes in social control in response to a lapse was accomplished by using a series of hierarchical regressions. Those who lapsed were operationalized as participants who reported a drop in physical activity of at least 2 KKD between any two measurement points. This minimum drop size was selected because a minimum lapse size of 2 KKD was thought to be meaningful, as it is equivalent to the difference between an adolescent receiving optimal health benefits (6-8 KKD) and not receiving health benefits (<4 KKD) for physical activity (Corbin, Pangrazi, & Welk, 1994). A drop of 2KKD also allowed maximization of the number of potential participants in the analysis.

With the potential for lapses to occur throughout the year, and the interest in this study being on the lapse and the time point following the lapse, it was important to match participants based on the lapse point. Pre-lapse, lapse, and post-lapse time points were identified for each participant who experienced a lapse (see Figure 3.1). These points were then aligned so that regardless of when the lapse occurred, the changes in social control from lapse to post-lapse points could be evaluated.

Three hierarchical multiple regressions were performed predicting change in each group of social control tactic groupings identified previously in Study 1 (i.e., positive, collaborative, and negative social control, each assessed separately). As the interest in this

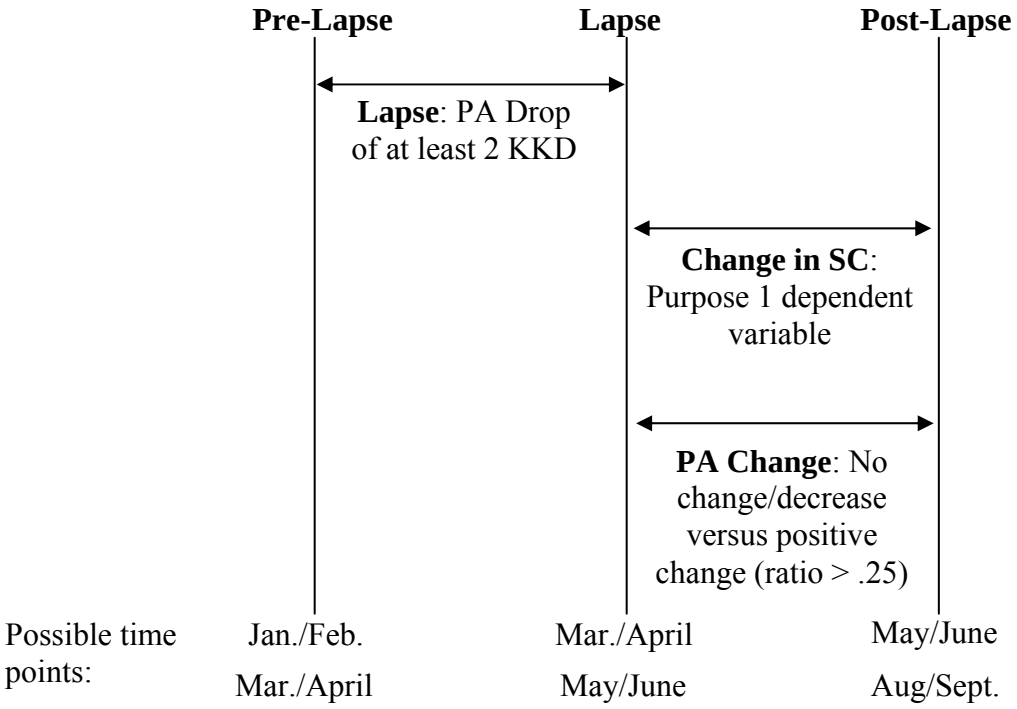

Figure 3.1 Schematic of Lapse and Post-Lapse Points

study was change in social control following a lapse, the social control reported at the lapse point was subtracted from the post-lapse social control creating a change score, which was then used as the dependent variable in this analysis.

To address the first hypothesis assessing change using the positive and collaborative social control tactics as the dependent variables, the first step in the regressions included the social control tactic used at the lapse point to control for the initial level. To replicate the analysis from Study 1, family activity (centered) and average physical activity of the adolescent (centered) were entered on the second step. The second hypothesis was assessed by way of a hierarchical regression with negative social control (SC) as the dependent variable and family activity (centered) and average physical activity of the adolescent prior to the lapse (centered) entered on the second step, followed by the interaction terms on the third step. For each of these regressions, the residual plots were evaluated to test for the assumptions of normality, linearity, and homoscedasticity.

The secondary purpose of this study was to examine whether changes in social control would predict those who returned to being active versus those who did not return. A discriminant function analysis was performed using the change values in social control scores (lapse to post-lapse) to predict whether individual's physical activity levels increased or not following the lapse. To identify individuals whose physical activity level increased following a lapse, a ratio of change in activity compared with the pre-lapse level was calculated. Values of 0 or less indicated that the physical activity from lapse to post lapse remained the same or decreased. A value larger than 0.25 was selected to represent individuals whose physical activity increased, as it reflects an increase of at least 25% of their pre-lapse level. This increase of at least 25% of the initial level was selected as it maximized the number of individuals who reported a positive change at this level in the short-term, while ensuring that the increase was meaningful. With regard to meaningfulness, a 25% increase for those individuals with a mean pre-lapse physical activity level (12.4 KKD) would be roughly equivalent to an increase of one hour of walking per day. As this is a replication of Study 1, a more conservative alpha level was selected ($\alpha = .05$).

3.2 Results

3.2.1 Identifying Adolescents who Lapsed

Using the criterion of a minimum decrease in physical activity of at least 2 KKD, 365 individuals out of 547 were identified as experiencing a lapse. As mentioned previously, the lapses occurred throughout the year (see Figure 3.2 for distribution of lapses). However, as the *in motion* prospective study did not assess social influences at the third time point (Jan./Feb.), only adolescents (n = 123) who experienced a lapse at time 4 (March/April) or 5 (May/June) were included as they had social control items at their lapse and post-lapse points (see Figure 3.2). Of those 123 adolescents, 17 individuals were missing values on positive and collaborative social control and 18 individuals were missing values of negative social control bringing the final sample size to 106 for analysis of positive and collaborative social control and 105 for negative social control.

Lapses also were identified in individuals who were not included in this study. Some of these excluded individuals had lapsed at Time 2 (Nov./Dec.) or Time 3 (Jan./Feb.), and as social control items were not assessed at Time 3 (Jan./Feb.) no change in social control could be calculated. Additionally, individuals who lapsed at Time 6 (Aug./Sept.) were excluded as no post-lapse score was available for them. To evaluate the similarity of those who lapsed and were included in the analysis with those who were excluded, independent t-tests were run comparing physical activity prior to the lapse (pre-lapse) and the size of lapse (difference between pre-lapse and lapse). Based on independent samples t-tests, there were no differences between lapsers included in this study and those who were excluded based on their pre-lapse physical activity, t (262.1) = .69, p > .05, and lapse size, t (363) = 1.03, p > .05 (see Table 3.1 for means).

Additional comparisons were performed to compare these two groups of individuals with lapses (i.e., those included and those excluded) with individuals who did not experience a lapse on age (ANOVA) and sex (chi-square; see Table 3.1). There was no difference between the three groups on sex, χ^2 (2) = 3.06, p > .05. However, the three groups did differ on age, F (2, 501) = 6.56, p < .01, with individuals with lapses included in this study being significantly younger than the other two groups (i.e., lapsed but not included and no lapse).

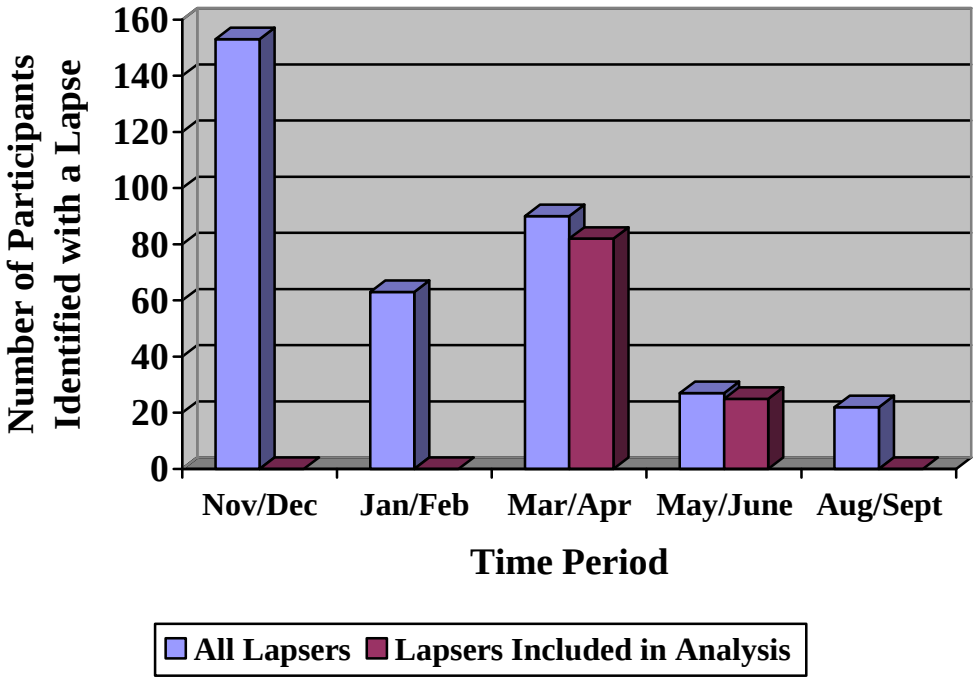

Figure 3.2 Distribution of Lapses

Table 3.1 Comparison of Individuals Included versus those Excluded in Analysis

	Lapse-included	Lapse-not included	No Lapse
	mean (*SD*)	mean (*SD*)	Mean (*SD*)
Age (years)[a]	15.8 (1.12)	16.2 (1.2)	16.3 (1.2)
PA pre-lapse (KKD)[b]	12.4 (5.7)	12.9 (7.8)	NA
Lapse size (KKD)[c]	-8.1 (4.6)	-7.5 (4.9)	NA
	frequency (%)	frequency (%)	frequency (%)
Sex[d] – female	57 (56.4%)	123 (48.6%)	84 (56.4%)
– male	44 (43.6%)	130 (51.4%)	65 (43.6%)

[a] F (2, 501) = 6.56, $p < .01$; Lapse-included < (Lapse-not included = No Lapse)

[b] t (262) = .69, $p > .05$

[c] t (363) = 1.03, $p > .05$

[d] χ^2 (2) = 3.06, $p > .05$

For those individuals with a lapse who were included in this study (n = 106), their average pre-lapse physical activity was 12.4 KKD (SD = 5.7), which dropped to 4.3 KKD (SD = 3.7) at the lapse point. A paired samples t-test showed this drop in physical activity was significant, t (105) = 18.22, $p < .001$. Of the 106 participants who specified their sex, just over half were girls (56%, n = 57). The average age of these participants was 15.8 years (SD =1.12).

3.2.2 Reliability of Social Control Items

For collaborative and positive social control, Cronbach's (1951) alphas were calculated for the lapse and post-lapse point. For positive social control (4 items), the alphas were .81 and .77 for the lapse and post-lapse points, respectively. The alphas for lapse and post-lapse collaborative social control (2 items) were .73 and .71, respectively. As negative social control was assessed with one item (ordering), no alpha was calculated.

3.2.3 Predicting Change in Social Control

The inspection of the residual plots for hierarchical regressions predicting change in positive, collaborative, and negative social control appeared to meet the assumptions for normality, linearity and homoscedasticity, indicating no need for transformations.

Positive social control at the lapse point significantly predicted change in positive social control from lapse to post-lapse, F (1,104) = 21.69, $p < .001$ accounting for 17% of the variance (see Table 3.2 for summary). Family physical activity (average of pre-lapse levels) and adolescent's average physical activity (average of pre-lapse levels) accounted for an additional 7.5% of the variance in the change in positive social control, F_{Δ} (2,102) = 5.08, $p < .01$. For the full model, both family activity, b = .19 (SE = .07), t = 2.85, $p < .01$ and positive social control at the lapse, b = -.38 (SE = .07), t = -5.54, $p < .01$, predicted the change in positive social control, whereas adolescent average physical activity did not ($p >$ .05).

In terms of collaborative social control, values at the lapse point for collaborative social control significantly predicted change in social control accounting for 34% of the variance, F (1,104) = 54.13, $p < .001$. The addition of family activity and adolescent average activity added an additional 9.6% of variance explained in the prediction of change in collaborative social control, F_{Δ} (2, 102) = 8.72, $p < .001$ (see Table 3.2 for a summary). All three predictors contributed to the prediction of change in collaborative social control:

Table 3.2 Summary of Regressions Predicting Change in Social Control

Tactic	Step	Predictor	R^2	R^2_Δ	F_Δ	$F_{overall}$	Unstandardized Coefficient (SE)
Positive	1 [a]		.17			21.69***	
	2 [b]		.25	.08	5.08**	11.18***	
		SC at lapse					-.38 (.07)***
		Family PA					.19 (.07)**
		Child PA					.01 (.01)
Collaborative	1 [a]		.34			54.13***	
	2 [b]		.44	.10	8.72***	26.53***	
		SC at lapse					-.66 (08)***
		Family PA					.22 (.08)**
		Child PA					.05 (.02)**
Negative	1 [a]		.20			25.29***	
	2 [b]		.20	.00	.18	8.41***	
	3 [c]		.21	.01	.69	6.46***	

**p<.05
***p<.001

[a] Step 1 predictors: SC at lapse

[b] Step 2 predictors: SC at lapse, Family physical activity (centered), Child physical activity (centered)

[c] Step 3 predictors: SC at lapse, Family physical activity (centered), Child physical activity (centered), Family physical activity x Child physical activity interaction

collaborative social control at lapse, b = -.65 (SE = .08), t = -8.56, p < .001, family activity, b = .22 (SE = .08), t = 2.63, p < .01, and adolescent average activity, b = .05 (SE = .02), t = 2.88, p < .01.

To address the second hypothesis concerning change in negative social control, negative social control at lapse, family activity, adolescent activity, and the family by adolescent activity interaction were included as predictors in the regression. The first step, which contained negative social control at the lapse, accounted for 20% of the variance, F (1, 102) = 25.29, p < .001 (see Table 3.2 for a summary). The addition of family and adolescent activity did not significantly add to the prediction, F_{Δ} (2, 100) = .18, p > .1 nor did the interaction between family and adolescent activity explain any additional variance, F_{Δ} (1, 99) = .69, p > .1.

3.2.4 Predicting Change in Activity Following a Lapse

The second purpose, which was to examine whether change in social control was related to change in physical activity following a lapse, was addressed with a discriminant function analysis predicting those who did not return (ratio $\leq$ 0; n = 42) versus those who improved in activity (ratio $\geq$ .25; n = 40). A description of the physical activity levels of these two groups is provided in Table 3.3. The results revealed a significant difference between groups with a canonical correlation of .32, explaining approximately 10% of the variance, Λ = .90, χ^2 (2) = 8.59, p < .05. Overall, 63% of the participants were correctly classified into groups, with 67% correctly classified in the no return group and 60% correctly classified in the positive change group. The no return group had a centroid of -.33 and the positive change group had a centroid of .34. An inspection of the discriminant function coefficients revealed that change in collaborative social control loaded with the positive change group (*coefficient* = .82), while change in positive social control (*coefficient* = .24) and change in negative social control (*coefficient* = .16) did not appear to load with either group (see Table 3.4 for group means and discriminant function coefficients).

3.3 Discussion

The main purpose of this second study was to examine whether a lapse in self-reported physical activity would be associated with a change in social control as reported by the recipient. This study attempted to replicate and extend the findings from Study 1. As Study 1 demonstrated that social control may be exerted following a hypothetical physical

Table 3.3 Mean Physical Activity Levels (SD) of the Groups included in the DFA

Time Point	No Return (*n* = 42) mean (*SD*)	Positive Change (*n* = 40) Mean (*SD*)
Pre-Lapse	12.0 (5.4)	12.3 (6.0)
Lapse	4.5 (3.2)	4.0 (4.3)
Post-Lapse	2.5 (2.5)	11.2 (7.3)

Table 3.4 Means (Standard Deviations) and Discriminant Function Coefficients

Change in:	No Return (*n* = 42) mean (*SD*)	Positive Change (*n* = 40) mean (*SD*)	Coefficients
Positive SC	-.06 (.84)	.26 (.67)	.24
Collaborative SC	-.17 (1.04)	.48 (.93)	.82
Negative SC	-.05 (.99)	.25 (1.28)	.16

activity lapse, this study examined the changes in social control following an actual lapse. It was expected that a high level of parent activity would be associated with an expectation that a child be active, and as such, would elicit social control attempts by those parents in response to a lapse in physical activity.

One key finding from this study appears to be the importance of parental physical activity in predicting change in both collaborative and positive social control. These findings replicate the results from Study 1 that also demonstrated a relationship between parental physical activity and perceptions of control for both of these tactic types. As hypothesized, adolescents with active parents reported greater changes in both collaborative and positive social control in response to an activity lapse than adolescents with less active parents.

The relationship between parental activity and use of social control fits within the definition of social control. Given that the use of social control is tied to the deviation from a normative behaviour (Clark & Gibbs, 1965; Lewis & Butterfield, 2005), and an individual's own behaviour is a source of information for forming norms (Miller & Prentice, 1996), it may not be surprising that parental activity was associated with social control. Additional support for this relationship also was shown by Strachan and colleagues (2006), who found active mothers provided more social control than less active mothers.

One finding in this study that differed from Study 1 was the emergence of the adolescent physical activity as a predictor of collaborative social control, which is consistent with the suggestion that the adolescent's typical behaviour may act as a source of information informing parents' expectations for their child's activity level (Miller & Prentice, 1996). Differences in the design between Study 1 and the present study may help to explain this seeming contradiction. The specification of child's activity in the scenarios in Study 1 may have attenuated the influence of child activity and may provide a rationale for the difference emerging for collaborative social control between the two studies.

While parent and adolescent activity were able to predict changes in positive and collaborative social control following a lapse, no relationships were found for negative social control contrary to the findings from Study 1. One possible reason for the differences may lie in the fact that the items comprising negative social control were different in the two studies, wherein Study 1 including both nagging and ordering while this study only used ordering. It is possible that a different relationship emerged between negative social control and parent

and child activity because of the exclusion of nagging in the current study or the use of a single item, which may reflect a less reliable measure (Loo & Kells, 1998).

Another possible explanation may relate to the age of the children. The children of the parents used in Study 1 were younger with a mean age of 8.6 years compared to the mean age of 16 years in the present study. It is possible that characteristics of these age grouping may explain differences. For example, a major component of the parent-child relationship during adolescence is the negotiating of autonomy (Noack & Buhl, 2004a). With increasing autonomy of adolescents, parents may have not used negative social control as it may have been perceived as violating the adolescent's autonomy.

The second purpose of the present study was to explore whether the change in social control following a physical activity lapse would be associated with change in physical activity following the use of social control after a lapse. Given that social control serves a regulatory function (Lewis & Butterfield, 2005), it may not be not surprising that the relationship between changes in social control and physical activity was positive. An inspection of the means revealed that those who increased their physical activity following a physical activity lapse reported higher levels in all three types of social control (e.g., positive, negative, and collaborative) than those who did not change or decreased. This suggests that parental use of social control following a lapse may be associated with their children increasing their physical activity.

Although the means were in the same direction for all three types of social control, results from the discriminant function analysis suggested that change in collaborative social control was the predictor that best distinguished the two activity change groups. As the items included within collaborative social control require the child to perform some activity (i.e., offer to do activities with them, or help child learn), increasing collaborative social control requires that the adolescent do more physical activities. Additionally, a review showed that direct help by parents was positively related to adolescents' physical activity levels (Sallis et al., 2000). These findings suggest that parents' use of collaborative social control may be useful in helping adolescents increase their physical activity following a physical activity. In another behaviour change setting, Meichenbaum and Turk (1987) suggest communication that involves a collaborative approach, or shared responsibility on the part of both parties, is expected to enhance adherence to treatment. Transferring this to the present study where the

parent is trying to regulate the adolescent's behaviour, using methods that involve actions on the part of both parties may represent shared responsibility resulting in an increase in the adolescent's activity following a lapse.

Given that changes in positive and negative social control were not strongly related to changes in physical activity in this study, one wonders whether these types of social control are useful in helping adolescents return to being active. However, before discounting the importance of these types of social control, the examination of other factors might be informative. For example, it has been suggested that the perception of the provider as being supportive may influence the recipient's reaction to the social control (Westmaas et al., 2002). Additionally, some have suggested the need to match the needs of the situation to the social influences used for optimal results (Cutrona & Russell, 1990; Rook & Underwood, 2000). Further research is needed to investigate whether positive and negative social control can influence behaviour, if moderators need to be considered, or if these types of social control are not effective in influencing subsequent behaviour change.

This study has several strengths. First, while previous research has primarily used cross-sectional surveys, this study used a longitudinal dataset that included actual lapses, which builds on previous studies in two ways. First, this study enhances the ecological validity of the findings by examining actual self-reported lapses as opposed to the hypothetical scenarios used both in Study 1 and in previous research (Lewis & Butterfield, 2005).

Second, while other studies in the social control literature have used a longitudinal design following individuals over time, they were focused on how social control predicted subsequent behaviour change (Helgeson et al., 2004; Westmaas et al., 2002). This study focused on predicting change in social control following a deviation from a desired behaviour. This idea of focusing on a deviation is central to the definition of social control (Clark & Gibbs, 1965), but has not received much attention in the literature.

Additionally, both the size of the lapse and the size of the change in physical activity following a lapse for those who increased their activity appeared meaningful. In terms of the former, the average physical activity level prior to the lapse was 12.4 KKD suggesting that on average those adolescents who lapsed in this study were individuals who were attaining health benefits (> 6KKD). The size of lapse also was meaningful as the resulting level of

activity following the lapse (4.3 KKD) is less than the level that is suggested for attaining minimal health benefits (< 6 KKD; Corbin et al., 1994), which highlights the potential health threat of these physical activity lapses.

Additionally, when looking at the sizes of change that were compared for the second purpose, the increase in activity during recovery appeared substantial. Those who increased by at least .25 of the original value increased to a level that was sufficient for health benefits increasing from an average of 4.0 KKD to an average of 11.2 KKD. In contrast, for those who decreased or remained the same, their physical activity went from 4.5 KKD at the lapse to 2.5 KKD, a level that is not associated with health benefits (Corbin et al., 1994). As such, changes in social control appeared to be able to differentiate those individuals who recovered enough from a lapse to achieve activity levels sufficient for health benefits versus those who did not.

Although there are several strengths associated this study, there are some limitations worth noting. As this study used a pre-existing data set, several limitations stem from reliance on the existing design and measures from the *in motion* study. For example, the temporal nature of this study required assessing physical activity and social influences every two months. However, at each assessment point, participants were required to report physical activity and social influences for a one month period leaving a gap of one month that was not assessed. As the existing literature does not address timing, the lag time between a lapse and parent's use of social control is unknown, and thus it is unclear as to the effect of the one month gap on the current results.

While individuals who experienced a lapse were followed over time, without a comparison group, it may be possible that the findings from this study could be attributed to an event that occurred in the environment (e.g., history or maturation). As the inclusion of a comparison group of individuals over the same period of time would have strengthened the design of this study, efforts were made to identify a group of individuals who did not experience a lapse but had similar activity levels prior to the lapse within this dataset. Unfortunately, the number of individuals in this category was not sufficient to permit a meaningful comparison. Although history and maturation remain possible explanations, the time of a lapse in the present study included two time periods (March/April and May/June), which may reduce history and maturation as possible alternative explanations. Additionally,

the finding of similar results in Study 1, suggest that the findings may be better explained by social control as opposed to history or maturation.

Another limitation of this study was that parents' expectations for their child's activity were not assessed. As a central premise of the use of social control is that social control is exerted when the expectations or norms for that behaviour are violated (Lewis & Butterfield, 2005), it is unclear if this was the case in the present study. Rather, it was assumed that a lapse of 2 KKD would be sufficient to violate parents' norms for their child's activity. Further research needs to consider parent's expectations specifically when identifying lapses in activity, and evaluate how parent and child activity are related to these expectations.

Along similar lines, another limitation concerns the fact that the reason for the lapse was not assessed. It is possible that a lapse identified in this study may have been due to sickness or injury where a parent may not have expected their child to be active and not exert social control. This lack of knowledge for the reason behind the lapses may have decreased the strength of the findings or provided an explanation for not finding some of the expected relationships (e.g., negative social control). However, the average size of lapse (approximately 8 KKD), combined with the fact that these lapses were calculated from a one month recall of physical activity assessed two months apart, suggest that these lapses may not be due to anything obvious such as being sick one day or sprained ankle, but reflective of a more enduring pattern of activity.

As few studies have examined social control in the parent-child relationship, there are several questions that remain unanswered. One finding from this study was that only collaborative social control appeared to be related to behaviour change following a lapse. Future research needs to examine why this might be the case. Given that no relationship was found for positive and negative social control, one wonders if these types of social control may be less useful in altering physical activity behaviour, or if other factors need to be considered. For example, it has been suggested that it may be important to match the needs of a situation to the specific social influence used (Cutrona & Russell, 1990). It may be that in the present study, positive and negative social control did not meet the needs of adolescents, and thus, were not related to behaviour change.

Alternatively, it also has been suggested that the perceived supportiveness of the social control may play a role in its effectiveness (Westmaas et al., 2002). In the present study, it is unknown how adolescents perceived the use of the social control. If positive and negative social control were not viewed as supportive, they may not have been expected to be related to change in physical activity. Further research is necessary to explore perceived supportiveness to evaluate whether it plays a role in how adolescents respond to social control.

Additionally, the present study only examined one possible reaction to social control (e.g., behaviour). Other studies have suggested that the use of social control also may elicit an emotional response (Lewis & Rook, 1999; Tucker, Orlando, Elliott, & Klein, 2006). With this in mind, it may be important to consider how adolescents respond to parental social control in terms of both behaviour and affect.

With the emphasis in Studies 1 and 2 on physical activity lapses as an antecedent of social control, more research is needed to focus on the consequences of the social control that is used. The present study took a preliminary look at how adolescents reacted to the social control that their parents used. However, the relationship between change in social control and change in physical activity in the present study was relatively weak (i.e., accounting for 10% of the variance). This combined with previous research showing mixed results for the relationship between social control and subsequent behaviour (Helgeson et al., 2004; Westmaas et al., 2002) highlights the need to examine the consequences of social control (i.e., adolescents' reactions) in more detail. Study 3 examined this relationship in more depth by examining possible moderators. Two specific moderators that were examined in Study 3 that might help explain the social control-behaviour relationship included the adolescents' preferences for their parents' use of social control and perceptions of supportiveness of the social control tactics used.

CHAPTER 4

STUDY 3: SOCIAL CONTROL USE BY A PARENT FOLLOWING A PHYSICAL ACTIVITY LAPSE: CHANGES IN ADOLESCENT'S BEHAVIOUR AND AFFECT

Social control has been suggested to be related to behaviour both as an antecedent and consequence (Lewis & Butterfield, 2005). The results from Studies 1 and 2 in this dissertation provided support for physical activity lapse serving as an antecedent to the use of social control by parents. Specifically, parents reported using more positive, collaborative, and negative social control tactics in response to the physical activity lapses of children that violated the parents' expectations (Study 1).

Given that social control may be serving to regulate behaviour, examining the consequences of this regulatory influence becomes important. Results from Study 2 suggest that the use of social control tactics by parents may be related to changes in physical activity behaviour on the part of the adolescent. However, this relationship was modest, accounting for approximately 10% of the variance in physical activity change. Only collaborative social control predicted change.

The idea of examining the relationship between use of social control and subsequent behaviour change is not new. For instance, the relationship between social control use and changes in health behaviours have been examined extensively in the family setting (Fekete et al., 2006; Helgeson et al., 2004; Lewis & Butterfield, 2005; Lewis et al., 2004; Lewis & Rook, 1999; Rook et al., 1990; Tucker, 2002; Westmaas et al., 2002). Several prospective studies have demonstrated a positive relationship between use of social control and behaviour, in that social control attempts have been associated with a positive change in behaviour. For example, Westmaas and colleagues (2002) followed smokers prospectively, and found that greater social control use by their partner was associated with greater reductions in smoking. Similarly, in adults recovering from knee surgery, spouse's use of positive social control following surgery was associated with better adherence to the medical recommendations provided (Fekete et al., 2006).

However, the relationship between social control and behaviour change has not always been positive. For example, Tucker and Anders (2001) found that spouses' use of negative social control related to their partner hiding the deviant behaviour or ignoring the spouse all together. Further, in a study looking at behaviour in a cardiac rehabilitation setting, spouses' use of social control was related to poorer health behaviours in the form of poorer diet, less exercise, and worse stress management in the partner at a subsequent time point (M. M. Franks et al., 2006).

Given the mixed findings for behavioural reactions to social control, it is possible that other factors might be impacting the social control - behaviour change relationship. In this regard, the identification of a third variable that modifies or alters the original relationship (i.e., moderator) may clarify the conditions when a relationship between social control and behaviour exists (Bauman, Sallis, Dzewaltowski, & Owen, 2002). Identification of salient moderators may help researchers better understand why relationships are stronger, weaker, or non-existent under different circumstances, and as such, may help in the interpretation of previous mixed results.

One possible factor that might temper the relationship between the use of social control and the recipient's behavioural reaction might involve the matching of the influence received to the needs of a specific situation (Cutrona & Russell, 1990; Rook & Underwood, 2000). It might be expected that when perceived use of social control matches the preferences of the recipient, the optimal result would be achieved, as the 'needs' of the situation would be met. For instance, women coping with breast cancer reported specific wants for the types of social influences preferred (e.g., social support), and a mismatch between these wants and the receipt of social influences was associated with negative consequences (Reynolds & Perrin, 2004). In an activity context, adolescents may prefer their parents to provide specific types of control when their physical activity lapses, and may respond differently when there is a match between their preferences and the receipt of social control versus when there is a mismatch.

Another variable that could alter the relationship between use of social control and possible changes in the recipient's behaviour is the recipient's perceptions of the intent of the social control being received. Along these lines, Westmaas and colleagues (2002) have suggested that the recipient's perception of the social control as supportive may play a role in

the success of the influence. As such, exploring the recipient's perceptions of the intent of the social control relative to the prediction of adolescents' reaction to social control warrants examination.

Another possible consequence to the use of social control is the recipient's emotional reaction (Lewis & Butterfield, 2005). Several studies have provided support for the association between the use of social control and emotions, such as psychological well-being, distress, and affect (Fekete et al., 2006; M. M. Franks et al., 2006; Lewis & Rook, 1999; Tucker & Anders, 2001). However, the direction of the relationship is less clear. Some studies have reported that social control elicits greater psychological distress and negative affective responses (Fekete et al., 2006; Lewis & Rook, 1999; Rook et al., 1990), while others have shown that different types of social control have been associated with both negative and positive emotional reactions (Tucker & Anders, 2001; Tucker et al., 2006).

The purpose of this third study was two-fold. First, it was to explore the perceived use and preferences for social control, and how the congruence between preferred and perceived use of social control would relate to behaviour change and affect (Cutrona & Russell, 1990; Rook & Underwood, 2000). It was hypothesized that when there was congruence between perceived use and preferences for social control, adolescents would report greater behaviour change. A second hypothesis predicted that when there was congruence between perceived use and preferences for social control, more positive affect would be reported by adolescents.

The second purpose was to explore whether perceiving the use of social control as supportive would add to behaviour change and affective feelings over and above that of the use of the social control tactics (Westmaas et al., 2002). It was hypothesized that when adolescents perceived social control as supportive, this variable would add to the prediction of behaviour change beyond that explained by perceived use alone. It also was hypothesized that perceptions of social control as supportive would add to the prediction of affect beyond that explained by perceived use of social control tactics alone.

4.1 Method

4.1.1 Participants

Participants for this study were adolescents ($N = 63$) between the ages of 12 and 18 years, with a mean age of 14.2 years ($SD = 1.3$), who were recruited from a variety of physical activity programs. The majority of the sample was female (83%; $n = 52$).

4.1.2 Procedures

Ethics approval for this study was provided by the University Ethics Review Board (Appendix A). The researcher met with potential participants either prior to or during their activity programs to explain the purpose and procedures of the study. These activity programs included community sport teams, University swimming programs and University day camps. Interested individuals were provided with a package containing a parental consent form, assent form, questionnaire, and return envelope. Participants were instructed to complete the questionnaire at home and return the parental consent form, assent form, and questionnaire in a sealed envelope to their activity leader the next day.

4.1.3 Measures

Activity Lapse Prompt. Participants were provided with a written prompt (see Appendix G) that asked them to recall a time in their past when their activity level had dropped to a very low level for at least two weeks. It also was made clear that the drop they identified should not have occurred because of anything obvious (e.g., sickness, injury). Two additional questions were included to help the participant recall this lapse (i.e., how long ago the lapse occurred and how long did it last). Also, adolescents were asked questions about the importance to them as well as their parents of returning to being active after the lapse, 'How important was it to *you* (*your parents)* that you change your activity pattern back to what it previously was?'. Responses were made on a 1(*not at all important*) to 7 (*very important*) scale. After identifying this drop in activity, participants were instructed to answer a series of questions based on the drop about the influences they received, their reaction, and their perceptions of the supportiveness of the influences they received from parents.

Social Control Use and Perceptions of Supportiveness. The same 9 tactics used in Study 1 were used to assess social control in this study (Table 4.1 for a list of tactics; Appendix H). After identifying the lapse period, participants were asked: "When your activity level dropped, did you notice your parent(s) doing any of the following things to influence you to be more active?" Participants were then presented with the 9 tactics and responded to each individually on a scale from 1 (*never*) to 7 (*frequently*). The difference between the questions used in the present study and those used in Study 1 involved rewording the questions to reflect what tactics their parents used when their activity level

Table 4.1 List of Social Control Tactics Assessed

Type of Tactic	Tactic
Positive	Parent(s) said to you that physical activity was good for you
	Parents(s) provided financial support (e.g., pay for equipment, the program, etc.) so you could be active
	Parent(s) gave you more encouragement to stick with your physical activities
	Parent(s) talked to you more about how much fun physical activity was
Collaborative	Parent(s) participated more in physical activity themselves to influence you through their example
	Parent(s) offered to be more active with you
	Parent(s) helped you to learn/improve the skills that you would use in being active
Negative	Parent(s) ordered you to be active
	Parent(s) nagged you to be more active

dropped. If participants did not report that their parents used a specific tactic, they were directed to proceed to the next tactic.

An additional item for each tactic assessed the participants' perceptions of the supportiveness associated with the use of each tactic (see Appendix H). Participants were asked to rate the extent that they perceived their parents were trying to 'support' their physical activity when using each tactic on a 7-point Likert type scale from 1=not at all to 7=very much so. Below is an example of a question assessing perceptions of supportiveness for one of the tactics.

By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

Behaviour Change. Following the identification of the use of each tactic, participants were asked whether this influence (tactic) impacted their activity behaviour (see Appendix H). This behaviour change measure was comprised of two items adapted from those developed by Lewis and colleagues for use in another context (Lewis & Butterfield, 2005; Lewis et al., 2004; Lewis & Rook, 1999). First, participants were asked to indicate 'How did their physical activities change because of this (use of the tactic)?' They were provided with the response options of decreased, increased, or no change. Participants were then asked 'How much did your physical activities change because of this?' The response to this item was made on a 7 point Likert scale (1= not at all to 7= very much). These two items were then combined to form a -6 to +6 scale of activity change. This was done by first converting the amount of change to a 0-6 scale and then multiplying it by the associated direction of change. Changes in activity were multiplied by -1 for deceases, +1 for increases, and 0 for no reported change.

Affect. For each tactic, participants were asked to report their affective response to the influence (see Appendix H). Participants were asked: "How did you feel about what your parent(s) was trying to do most to influence you?" and responded on a -3 (very negative) to +3 (very positive) scale. Other studies have used a similar item to assess affect (Hardy & Rejeski, 1989; Rejeski, Best, Griffith, & Kenney, 1987).

Preferences for Social Control. Participants also were asked what they would prefer their parents to do if the same situation was to occur again for each of the 9 tactics (see

Appendix I) using a 7- point Likert scale ranging from 1=not at all to 7= very much so. An example question is included below:

If the same situation was to occur again, indicate how much you would <u>want</u> your parent(s) to do <u>each</u> of the following behaviours in your attempts to be more active ?

Parent(s) *say to me that physical activity is good for me*?

1	2	3	4	5	6	7
Not at all						**Very much so**

4.1.4 Analysis Plan

First, the 9 social control tactics were placed into three groupings based on the factors that emerged in Study 1 (i.e., positive, negative, and collaborative), and Cronbach's (1951) alphas were assessed to determine the relationship of the items to each of the scale total scores. Separate alphas were calculated for each type of social control for use, preferences, perceptions of supportiveness, behaviour change, and affect. To assess the first purpose of exploring the congruence between perceived use and preferences for social control, two hierarchical regressions were used for each of the three groups of tactics predicting behaviour change and affect, respectively. On the first step, perceived use of social control (centered) and preferences for social control (centered) were entered. On the second step, the interaction between perceived use (centered) and preferences (centered) was added. The interaction was used to assess the hypothesis that congruence between perceived use and preferences would lead to increased behaviour change and affect. A similar procedure has been used for assessing congruence between preferred and actual behaviours in the leadership domain (Riemer & Chelladurai, 1995). Procedures outlined by Aiken and West (1991) were used for probing significant interactions by evaluating the simple slopes. The residual plots were examined to assess normality, linearity, and homoscedasticity.

To assess the second purpose of exploring how perceptions of the supportiveness of the social control tactics would influence behaviour change and affect, a series of hierarchical regressions were used to predict behaviour and affect with separate regressions performed for each of the three groups of tactics. Perceived use of the group of tactics was entered on the first step. The second step consisted of adding perceptions of supportiveness to the equation. Deviation from normality, linearity, and homoscedasticity based on the residual plots also

were examined and discussed where appropriate. Similar to Study 2, this study used an alpha level of .05.

4.2 Results

4.2.1 Scale Reliabilities

As social influence items were grouped in the same way as was done in Study 1, Cronbach's (1951) alphas were used to determine the internal consistency for these items. The alphas ranged from .63 for preferences for collaborative social control to .99 for perceptions of supportiveness for collaborative social control (see Table 4.2 for all alphas). Given that all the alphas fell within or above the adequate range (.5 to .7) suggested by Nunnally and Bernstein (1994), all were used in the subsequent analyses.

4.2.2 Characteristics of the Lapse

As can be seen in Table 4.3, the majority of participants recalled a lapse that occurred within the past year (59%; $n = 36$). Additionally, the lapses that participants reported were generally shorter than a month, with just over half of the lapses (52%; $n = 31$) lasting two weeks and another 30% ($n = 18$) lasting three to four weeks.

In terms of returning to previous activity levels, the majority of the participants reported a desire to change their activity pattern back to what it was previously with a mean importance rating of 6.1 ($SD = 1.2$) on a 7-point scale. Likewise, adolescents reported that their parents wanted them to change their activity back to what it was previously, with a mean importance rating for their parents of 5.7 out of 7 ($SD = 1.2$).

4.2.3 Congruence between Perceived Use and Preferences – Behaviour Change

The first hypothesis addressed whether the congruence between perceived use and preferences for social control would enhance the prediction of behaviour change. In terms of positive social control, results from the first step of the hierarchical regression revealed that use (centered) and preferences (centered) for positive social control significantly predicted behaviour change, accounting for 34% of the variance in behaviour change, $F(2, 58) = 14.96$, $p < .001$ (see Table 4.4 for a summary). Congruence between use and preferences was assessed on the second step of the regression by adding the interaction term between perceived use (centered) and preferences (centered). Results revealed that the interaction term added significantly to the prediction of behaviour change, adding an additional 12% to

Table 4.2 Cronbach's Alphas for Use, Preferences, Perception of Supportiveness, Behaviour Change and Affect

	Positive SC	Collaborative SC	Negative SC
Use	.73	.64	.67
Preferences	.75	.63	.80
Perceptions of Supportiveness	.90	.99	.84
Behaviour Change	.74	.73	.85
Affect	.87	.83	.85

Table 4.3 Characteristics of Lapses

	n	Percentage (%)
Occurrence of Lapse (N=61)		
Present time	4	7
Last Month	11	18
1-11 Months ago	21	34
More than 1 year ago	25	41
Duration of Lapses (N=60)		
2 weeks	31	52
3-4 weeks	18	30
More than 1 month	11	18

Table 4.4 Congruence of Perceived Use and Preferences Predicting Behaviour Change

Tactic	Step	Predictor	R^2	R^2_{Δ}	F_{Δ}	$F_{overall}$	Unstandardized Coefficient (SE)
Positive†	1[a]		.34			14.96***	
(n=61)	2[b]		.46	.12	12.81***	16.27***	
		Perceived Use					.76 (.23)***
		Preferences					.58 (.20)
		Interaction					.35 (.10)***
Collaborative	1[a]		.31			13.13***	
(n=62)		Perceived Use					.59 (.15)***
		Preferences					.16 (.17)
	2[b]		.32	.01	.98	9.09***	
Negative	1[a]		.07			1.21	
(n=34)	2[b]		.11	.04	1.30	1.25	

*p<.1
**p<.05
***p<.001

† See Table 4.5 & Figure 4.1 for the results of simple slopes analysis for positive social control

[a] Step 1 predictors: Perceived Use (centered), Preferences (centered)

[b] Step 2 predictors: Perceived Use (centered), Preferences (centered), Use x Preferences interaction

the variance explained, $F_{\Delta}(1, 57) = 12.81$, $p < .001$. Simple slopes analysis (Aiken & West, 1991) revealed that for those with higher preference for positive social control (1 SD above the mean), increased ratings of perceived use of positive social control was associated with increased behaviour change ($b = 1.17$ ($SE = .29$), $t = 4.07$, $p < .001$; see Figure 4.1 and Table 4.5). For those who preferred positive social control less (1 SD below the mean), perceived use of positive social control was not related to behaviour change ($p > .05$).

For collaborative social control, perceived use (centered) and preferences (centered) entered on the first step of the regression predicted behaviour change, $F(2, 59) = 13.14$, $p < .001$, accounting for 31% of the variance in behaviour change (see Table 4.4). Perceived use of collaborative social control was the best predictor, $b = .59$ ($SE = .15$), $t = 3.83$, $p < .001$. However, examination of congruence by the addition of the interaction term between perceived use (centered) and preferred (centered) collaborative social control on the second step did not add to the prediction of behaviour change $F_{\Delta}(1, 58) = .980$, $p > .05$.

The results from the analysis of negative social control revealed that neither perceived use (centered) or preferences (centered) for negative social control predicted behaviour change as main effects, $F(2, 31) = 1.21$, $p > .05$, nor as an interaction $F_{\Delta}(1, 30) = 1.30$, $p > .05$ (see Table 4.4 for a summary).

4.2.4 Congruence between Perceived Use and Preferences – Affect

For positive social control, perceived use (centered) and preferences (centered) predicted affect, $F(2, 58) = 25.01$, $p < .001$ (see Table 4.6), accounting for 46.4 % of the variance. The preferences for positive social control was the strongest predictor of affect, $b = .42$ ($SE = .11$), $t = 3.77$, $p < .001$. The perceived use of positive social control approached significance, $b = .23$ ($SE = .12$), $t = 1.94$, $p < .06$. The interaction examining congruence approached significance, $F_{\Delta}(1, 57) = 2.78$, $p < .1$, explaining an additional 2.5% of the variance.

In terms of collaborative social control, results from the regression revealed that perceived use (centered) and preferences (centered) predicted affect, $F(2, 59) = 23.47$, $p < .001$ (see Table 4.6), accounting for 44.3% of the variance in affect. Upon inspection of the regression coefficients, perceived use was seen to be the best predictor, $b = .40$ ($SE = .08$), $t = 5.10$, $p < .001$. The addition of the interaction term on the second step to test for congruence did not add to the prediction, $F_{\Delta}(1, 58) = .10$, $p > .05$.

Table 4.5 Simple Slopes for Positive Social Control Predicting Behaviour Change

	Unstandardized coefficient (SE)	t
Low Preferences (1 SD below)		
Perceived Use	.35 (.22)	1.61
High Preferences (1 SD above)		
Perceived Use	1.17 (.29)	4.07 ***
Low Perceived Use (1 SD below)		
Preferences	.20 (.22)	.86
High Perceived Use (1 SD above)		
Preferences	.96 (.24)	4.08***

**$p < .05$
***$p < .001$

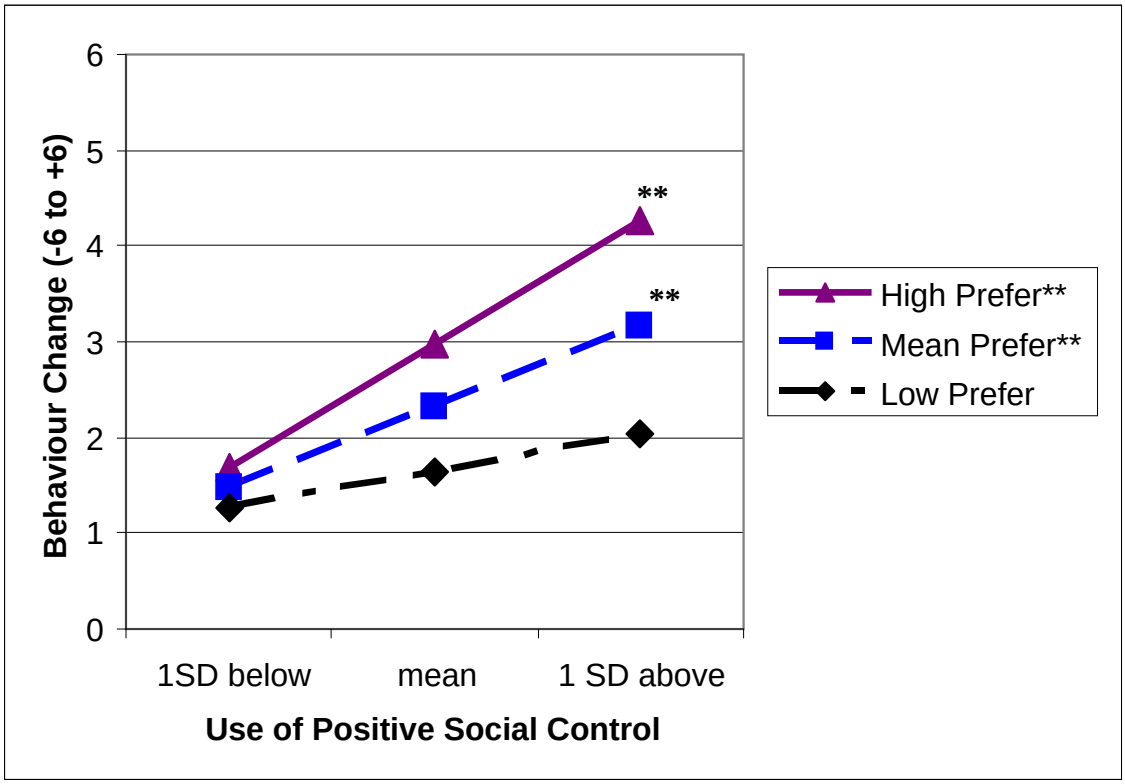

Figure 4.1 Relationship between Preferences and Use of Positive Social Control and Behaviour (**$p < .05$)

Table 4.6 Congruence of Perceived Use and Preferences Predicting Affect

Tactic	Step	Predictor	R^2	R^2_{Δ}	F_{Δ}	$F_{overall}$	Unstandardized Coefficient (SE)
Positive (n=61)	1[a]		.46			25.10***	
		Perceived Use					.23 (.12)*
		Preferences					.42 (.11)***
	2[b]		.49	.025	2.78	18.17***	
Collaborative (n=62)	1[a]		.44			23.47***	
		Perceived Use					.40 (.08)***
		Preferences					.11 (.09)
	2[b]		.44	.001	.10	15.44***	
Negative (n=34)	1[a]		.06			.90	
	2[b]		.06	.00	.01	.58	

* p=.06
**p<.05
***p<.001

[a] Step 1 predictors: Perceived Use (centered), Preferences (centered)

[b] Step 2 predictors: Perceived Use (centered), Preferences (centered), Use x Preferences interaction

Similar to behaviour change, the results for negative social control indicated that perceived use (centered) and preferences (centered) for negative social control did not predict affect, F (2, 31), = .90, $p > .05$, nor did the interaction add significantly to the explanation, F_{Δ} (1, 30) = .01, $p > .05$ (see Table 4.6).

4.2.5 Perceptions of Supportiveness – Behaviour Change[3]

The second purpose of this study was to explore whether the perceptions of supportiveness associated with the use of the social control tactics might be related to behaviour change and affect. For collaborative social control, perceived use entered on the first step explained 29.8% of the variance in behaviour change, F (1, 60) = 25.46, $p < .001$ (see Table 4.7). On the second step, perceptions of supportiveness added to the prediction over perceived use alone and explained an additional 16.2% of the variance, F_{Δ} (1, 59) = 17.67, $p < .001$. Inspection of the individual regression coefficients for the full model revealed that both perceived use, $b = .41$ ($SE = .13$), $t = 3.14$, $p < .01$, and perceptions of supportiveness, $b = .59$ ($SE = .14$), $t = 4.20$, $p < .001$, were significant predictors of behaviour change.

Perceived use of negative social control did not predict behaviour change, F (1, 31) = .16, $p > .05$. However, perceptions of supportiveness of that type of tactic entered on the second step explained 22.6% of the variance in behaviour change, F_{Δ} (1, 30) = 8.80, $p < .01$ (see Table 4.7), with perceptions of supportiveness being the only significant predictor, b = .62 ($SE = .21$), $t = 2.97$, $p < .01$ in the full model.

As congruence between perceived use and preferences was found to be important for the impact of positive social control on behaviour change, congruence was entered on the first step of the regression for positive social control, with perception of supportiveness entered on the second step. Results revealed that congruence predicted behaviour change, accounting for 46% of the variance, F (3, 57) = 16.27, $p < .001$. The addition of perceptions of supportiveness did not add to the prediction of behaviour change above that contributed by the congruence of perceived use and preferences, F_{Δ} (1, 56) = 1.28, $p > .05$ (see Table 4.7).

[3] Of note, perceptions of control (i.e., whether the adolescent perceived the parent was trying to persuade them to be more active) also was assessed. When perception of control was included with perceptions of supportiveness in predicting behaviour change and affect, it did not significantly contribute to any predictions.

Table 4.7 Perceptions of Supportiveness Predicting Behaviour Change

Tactic	Step	Predictor	R^2	R^2_{Δ}	F_{Δ}	$F_{overall}$	Unstandardized Coefficient (SE)
Positive	1 [a]		.46			16.27***	
(n=61)	2 [b]		.47	.01	1.28	12.59***	
Collaborative	1 [c]		.30			25.46***	
(n=62)	2 [d]		.46	.16	17.67***	25.10***	
		Perceived Use					.41 (.13)**
		Supportiveness					.59 (.14)***
Negative	1 [c]		.01			.16	
(n=33)	2 [d]		.23	.23	8.80**	4.50**	
		Perceived Use					.07 (.33)
		Supportiveness					.62 (.21) **

**p<.05
***p<.001

[a] Step 1 predictors: Perceived Use (centered), Preferences (centered), Perceived Use x Preferences Interaction

[b] Step 2 predictors: Perceived Use (centered), Preferences (centered), Perceived Use x Preferences Interaction, Perception of Supportiveness

[c] Step 1 predictors: Perceived Use

[d] Step 2 predictors: Perceived Use, Perception of Supportiveness

4.2.6 Perceptions of Supportiveness – Affect

The above analyses for behaviour change were repeated with affect as the outcome. For collaborative social control, perceived use entered on the first step explained 42.8% of the variance in affect, F (1, 60) = 44.82, $p < .001$ (see Table 4.8). Perceptions of supportiveness entered on the second step explained an additional 14.7% of variance in affect, F_{Δ} (1, 59) = 20.45, $p < .001$. Inspection of the individual regression coefficients for the full model revealed that both perceived use, $b = .31$, ($SE = .07$), $t = 4.77$, $p < .001$, and perceptions of supportiveness, $b = .32$ ($SE = .07$), $t = 4.52$, $p < .001$, were significant predictors.

In terms of negative social control, perceived use of that tactic did not predict affect on its own, F (1, 32) = .34, $p > .05$ (see Table 4.8). However, the addition of perceptions of supportiveness on the second step explained 44.0% of the variance in affect, F_{Δ} (1, 31) = 24.82, $p < .001$. In the full model, perception of supportiveness was a significant predictor of affect, $b = .67$ ($SE = .13$), $t = 4.98$, $p < .001$.

For positive social control, the first purpose revealed that preferences predicted affect while perceived use approached significance ($p < .06$). As such, it was decided to include both variables in the first step to see if perceptions of supportiveness added to the prediction by preferences and perceived use. As was shown in the first purpose, preferences and perceived use entered on the first step explained 46.4% of the variance in affect, F (2, 58) = 25.01, $p < .001$, and the addition of perceptions of supportiveness on the second step explained an additional 11.0% of the variance in affect, F_{Δ} (1, 57) = 14.72, $p < .001$ (see Table 4.8). In the final model, preference was a significant predictor, $b = .29$ ($SE = .11$), $t = 1.75$, $p < .01$, as was perception of supportiveness, $b = .35$ ($SE = .09$), $t = 3.84$, $p < .001$.

4.3 Discussion

This study examined the relationship between parental use of social control and adolescents' reactions to that social control in terms of their behaviour and affect. The present study examined both preferences for social control as well as perceptions of the supportiveness of the tactics in an effort to better understand the previous mixed results between social control and the reactions of the recipient to the use of social control (Fekete et al., 2006; M. M. Franks et al., 2006; Tucker & Anders, 2001; Westmaas et al., 2002).

Table 4.8 Perceptions of Supportiveness Predicting Affect

Tactic	Step	Predictor	R^2	R^2_{Δ}	F_{Δ}	$F_{overall}$	Unstandardized Coefficient (SE)
Positive	1 [a]		.49			18.17***	
(n=61)	2 [b]		.60	.11	7.45***	16.34***	
		Perceived Use					.11 (.12)
		Preference					.30 (.11)**
		Supportiveness					.35 (.09)***
Collaborative	1 [c]		.43			44.82***	
(n=62)	2 [d]		.58	.15	20.45***	39.90***	
		Perceived Use					.31 (.07)***
		Supportiveness					.32 (.07)***
Negative	1 [c]		.01			.34	
(n=34)	2 [d]		.45	.44	24.82***	12.71***	
		Perceived Use					.06 (.21)
		Supportiveness					.67 (.13) ***

**p<.05
***p<.001

[a] Step 1 predictors: Perceived Use (centered), Preferences (centered)

[b] Step 2 predictors: Perceived Use (centered), Preferences (centered), Perception of Supportiveness

[c] Step 1 predictors: Perceived Use

[d] Step 2 predictors: Perceived Use, Perception of Supportiveness

The results of this study support the idea that preferences for social control may be important for understanding reactions to social control, at least in terms of the use of positive social control. It was found that when adolescents reported their parents using the positive social control tactics they preferred, higher ratings of behaviour change were reported. However, no relationship emerged when positive social control was not preferred. These results suggest that unless adolescents want their parents to provide positive social control (e.g., encouraging, telling them physical activities are fun), their behavioural response to this type of positive influence is muted. This result is consistent with the suggestion that when the influences provided match the situation, stronger results are expected (Rook & Underwood, 2000).

Adolescents' preferences for positive social control affecting how they react to the use of that influence may offer one possibility to explain why positive social control was not associated with those individuals returning to being active following a lapse in Study 2. Given that preferences were not assessed in Study 2, it is not possible to ascertain whether individuals wanted their parent to provide the positive social control or not. The present study revealed no relationship between use of positive social control and behaviour change if adolescents did not report preferences for positive social control. This might explain the lack of relationship found between use of positive social control and change in physical activity behaviour in Study 2.

While it appeared that the congruence between positive social control and adolescents' preferences for this type of social control was important, congruence was not identified as important for collaborative or negative social control. Similar to the results found in Study 2, adolescents' perceptions of their parents' use of collaborative social control was directly related to increased behaviour change. The findings from both of these studies provide preliminary evidence to suggest that use alone may be sufficient for behaviour change in the case of collaborative social control use. Supporting this finding are the results from a previous review, which reported that direct help from parents in physical activities was consistently related to physical activity in children and adolescents (Sallis et al., 2000). As collaborative social control in this study may reflect a form of direct help (e.g., help the child learn the skills), it may not be surprising that use of this tactic was related to behaviour change.

This idea of the importance of using influences that are collaborative in nature to foster behaviour change also has been seen in other areas. For instance, it has been suggested that individuals will have better adherence to a prescribed treatment when a collaborative approach that involves a shared responsibility is used (Meichenbaum & Turk, 1987). With respect to collaborative social control, this might transfer into adolescents sharing the responsibility for changing their own behaviour when they perceive their parent's involvement in the social control influence being used.

In contrast, use of negative social control did not emerge as a predictor of behaviour in Study 2 or in the present study. Given that this type of tactic is often seen as a 'pressuring' form of social control (Fekete et al., 2006), one might not expect to see a different relationship between social control and behaviour. In fact, one study showed that pressure from family and friends was not related to reduction in smoking for women, although it was for men (Westmaas et al., 2002). The present sample was primarily female, and results of this study were similar in that use of negative or 'pressuring' tactics were not related to behaviour change.

One suggestion put forth by Westmaas and colleagues (2002) to further understand the influence of these 'pressuring' tactics was to examine how the influence was perceived. They suggested that perceiving the tactic as more supportive may result in positive change. The current results revealed that the adolescent's perception that their parent's negative social control tactics were being supportive was associated with increased behaviour and affect. This contrasts with other studies where negative social control has been linked to worse behaviour and negative affect (Tucker & Anders, 2001; Tucker et al., 2006). In previous studies, negative social control may not have been perceived as supportive. The findings from the present study appear to agree with Westmaas and colleagues (2002) notion that assessing perceptions of supportiveness is important for understanding responses to pressuring influences.

The importance of the individual's perceptions of social control also emerged for affect, with perceptions of supportiveness being associated with more positive affect for all three types of social control (i.e., positive, collaborative, and negative). This positive relationship is contrary to what would be expected based on the dual effects model (Rook et al., 1990), which suggests that social control can be both beneficial, as it promotes healthy

behaviour, as well as detrimental as it is associated with negative affect and psychological distress. Some researchers have found support for the affective part of this model with social control associated with negative affect such as emotional distress and anxiety (Helgeson et al., 2004; Rook et al., 1990). However, this was not the case in the present study as the findings suggested that social control does not always lead to worse affect. Rather, it was revealed that positive affect emerged if the influence was perceived as supportive. Other researchers have found that it is not the tactics that are used that are related to the affect reported, but rather the perceived rationale associated with the use of the tactic by the partner (Lewis & Butterfield, 2005).

Although the present study did not look at the reasons underlying the influence, the phrasing of the question for supportiveness may be informative. Supportiveness was phrased as "trying to support me in becoming more active", which may suggest that the adolescent valued becoming more active and the parent was assisting the adolescent in his/her choice to change. Given that other researchers have suggested that affect may be important for predicting how someone responds to social control (Rook et al., 1990; Tucker & Anders, 2001), the perceptions of supportiveness may be important for understanding how adolescents react to social control. It is important to note that while the influences may be perceived as supportive, the tactics may still be couched within social control as they involve regulation by another.

In terms of affect, Lewis and Butterfield (2005) also have found that attributions surrounding why social control was used (e.g., social control being used for health versus appearance reasons) related to positive affect. As individuals try to make sense of the world around them by formulating explanations for outcomes (Heider, 1958), it is possible that perceptions of supportiveness may represent an attribution about the parent's actions, in that an adolescent may be perceiving that his/her parent is using the tactic to support him/her. Given that attributions for how others use social control have been related to affect (Lewis & Butterfield, 2005), viewing perceptions of supportiveness as an attribution may provide an alternative explanation for the relationship between perceptions of supportiveness and affect found in this study. Future research needs to clarify this relationship. One possibility in this regard would entail a consideration of the timing of the measurements. For example, in this study affect was assessed following the measurement of supportiveness, and as such, may

reflect the attribution that their parent was supportive as opposed to their parent using the specific tactic. Assessment of affect immediately after use, which is then followed by measurement perceptions of supportiveness, may serve to reduce the competing explanation that affect resulted from the forming of an attribution as opposed to the use of the tactic.

This study had several strengths. First, this study considered how adolescents respond to the regulatory actions of parents following a physical activity lapse. As physical activity lapses have not received much attention generally (Shields et al., 2008), with even less attention being directed to the social factors that occur following a lapse, little is known about the recipient's reaction to the use of social control tactics. An understanding of the factors that contribute to adolescents recovering from lapses may help to identify ways to assist individuals in recovering faster from these lapses.

Another strength of this study was the consideration of individual's specific reactions to each type of tactic, as other studies have examined the reactions as a whole (Fekete et al., 2006; Lewis & Butterfield, 2005). Results from the present study suggest that adolescents react to different types of social control in unique fashions depending on their use, preferences, and perceptions. If adolescents were asked to rate their affect and behaviour change as a whole, they would have been making a global assessment, and the nuances of individual types of tactics may have been lost.

A third strength of this study involved the inclusion of possible moderators to help further the understanding of how adolescents react to behaviour (Bauman et al., 2002). In the present study, the inclusion of moderators clarified the relationship for both positive and negative social control. For example, by considering adolescents' preferences for positive social control, the relationship between use and behaviour was qualified. Additionally, the examination of perceptions of support may offer one possible explanation as to why negative social control has not always been related to behaviour change, as the present results suggested that it may be the extent that negative social control is perceived as supportive that may be important in understanding the response.

Although the study had a number of strengths, there were several limitations that should be noted. One possible limitation may have been the reliance on adolescents recalling a past lapse. As with any recall, accuracy of the recall of a lapse may be limited (Shiffman et al., 1997). The decision to use recall was made to give the adolescents a more concrete

example on which to base their responses to subsequent questions than would have been provided with a hypothetical scenario. One study comparing recall to a current assessment of affect during a holiday showed that there was discrepancy in recalling specific details, but the overall relationship was similar (Kemp, Burt, & Furneaux, 2008). This finding suggests while there are limitations associated with using a retrospective recall, it still provides a method of assessing the constructs of interest.

A second limitation of this study was that the design precluded the formulation of any formative statements about cause and effect. Although the discussion thus far may have implied that social control leads to behaviour change; with social control and behaviour change assessed simultaneously, it is equally feasible that the behaviour change related to the social control that adolescents recalled. There is a need for future research to discern the direction of the relationships identified in this study by following individuals prospectively and manipulating the social control used.

Another possible limitation may be associated with the fact that the adolescents completed the questionnaires at home. As such, it is possible that a parent may have been present when the child completed the questionnaire. Given that adolescents were asked to report on what their parents did, and how they reacted to the social control, a parent's presence during questionnaire completion may have influenced the adolescent's responses. While there is nothing to suggest that this may have happened in this study, the possibility exists that the intrusion of the parent may have affected children's responses, thus this should be controlled in future research.

The single item used to reflect affect for each tactic also may be considered to be a limitation, as affect has been considered by some to reflect a more complex dimensional construct (Ekkekakis & Petruzzello, 2002). However, a single item measure has been used to assess affect in a variety of other exercise studies (Hardy & Rejeski, 1989; McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003), with the rationale being that single items help control subject burden when multiple administrations are required (Hardy & Rejeski, 1989; Rejeski et al., 1987). As multiple assessments of affect were needed in the present study (i.e., for each tactic), a single item measure was deemed appropriate to minimize participant burden.

Last, the sample for this study was mostly females and, as such, may limit the ability to generalize the findings to other populations. With other studies reporting sex differences in

the social influence-physical activity relationship (e.g., Sallis, Alcaraz, McKenzie, & Hovell, 1999), extending this research into a mostly male population may be beneficial.

There are several future directions that will further our understanding of physical activity lapses. First, as this study suggested that social control may be important for how adolescents respond to a physical activity lapse, future research should continue to explore the relationship between social control and lapse behaviour. It also may be beneficial to consider both perspectives of the dyad in further studies. By examining both sides of the dyad (e.g., both the parent and the adolescent), other variables such as relationship quality (Tucker, 2002) may be examined, and help in furthering our understanding of how adolescents react to the social control parents use.

In the present study, it also was assumed that the use of social control and perceptions of supportiveness were independent, and as such, each was analyzed accordingly. However, the possibility also exists that these two constructs interact. For example, it is plausible that use of a control tactic such as nagging may not be related to behaviour change or affect when perceived as low in supportiveness, but when perceptions of supportiveness are high, increased use may be related to behaviour change and affect. Future research should examine these possible interactions.

Future research also might want to explore how social control relates to other correlates that have been identified as important for physical activity behaviour. For example, as social influences prior to a lapse have been associated with self-efficacy following a lapse (Shields et al., 2008), one wonders how social control might be associated with self-efficacy. For example, the use of a collaborative approach, which involves actions on the part of the adolescent, might result in a mastery experience and therefore, might be associated with an increase in self-efficacy of the adolescent. Given that self-efficacy has been identified as a correlate of physical activity behaviour (Sallis et al., 2000), self-efficacy may serve as one possible mechanism for explaining the collaborative social control-behaviour relationship.

CHAPTER 5
GENERAL DISCUSSION

The main purpose of the studies in this dissertation was to examine the social influences associated with activity lapses in children and adolescents. While a number of studies have reported an association between social influences in general and physical activity in children and adolescents (Pugliese & Tinsley, 2007; Sallis et al., 2000; Van Der Horst et al., 2007), limited research has examined the role of social influences following a lapse in activity (Shields et al., 2008). Clarification of whether the social influences that are exerted following a lapse are reflective of social control (i.e., increase in use) may help us in understanding why previous research examining social influences in general and physical activity have shown some inconsistencies (Sallis et al., 2000).

An antecedents and consequences framework for social control presented by Lewis and Butterfield (2005) was adapted for use in the present dissertation to explain how social influence (i.e., social control) might be used in response to a physical activity lapse. Within this framework, lapses were viewed as antecedents of social control and the adolescent's reactions (i.e., change in reported activity and affective responses) were examined as possible consequences. Figure 5.1 (activity reaction) and Figure 5.2 (affective reaction) provide an overview of the significant results found in this dissertation for the three types of social control examined in these studies.

The overall findings revealed that a physical activity lapse appeared to be an antecedent of parents' social control use (Studies 1 and 2), especially with active parents. In terms of types of control used, results revealed that active parents appeared to use more positive and collaborative social control in response to a lapse than less active parents (Studies 1 and 2). The results from Study 1 also revealed that parents attempted to regulate their child's physical activity following a lapse when their expectation for their child attaining health benefits was violated.

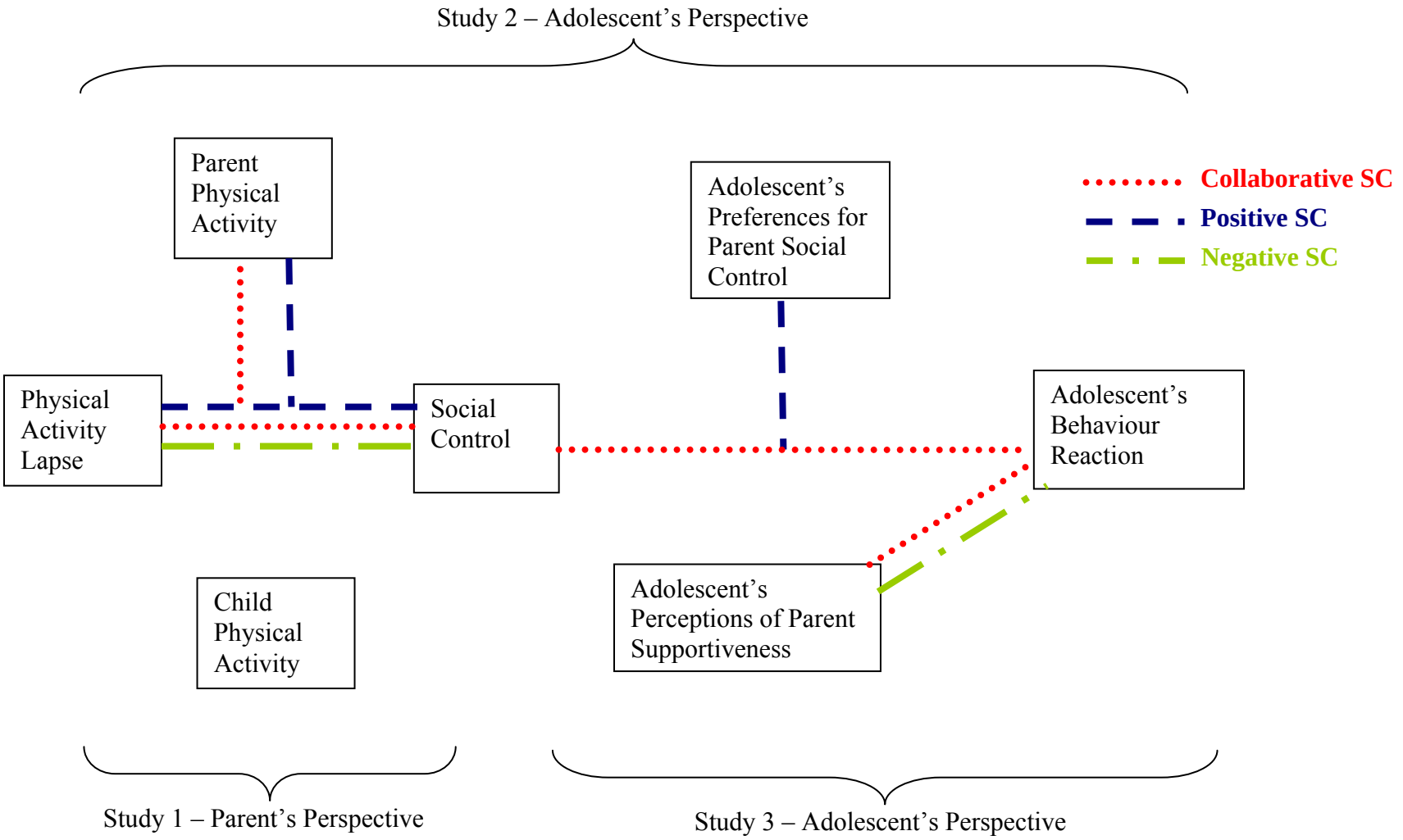

Figure 5.1 Conceptual Framework Revisited – Significant Links in Behaviour Reaction

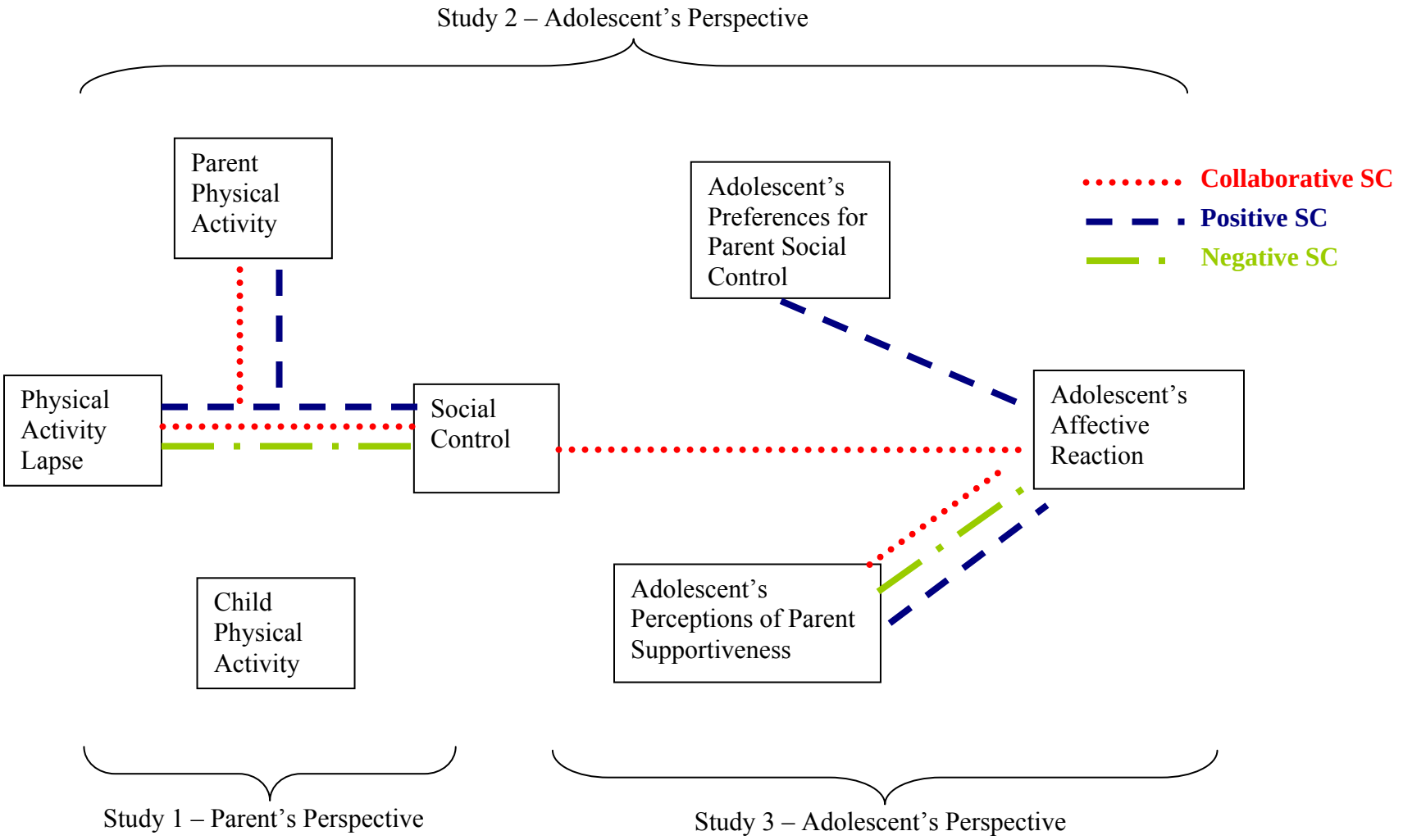

Figure 5.2 Conceptual Framework Revisited – Significant Links in Affective Reaction

As not all individuals recover from a lapse (Bouton, 2000), it also is important to understand the consequences of social control, or how adolescents might react to the use of social control by parents. Based on research in other settings, it might be expected that individuals would react differently to different types of social control (Tucker & Anders, 2001; Tucker et al., 2006), and that was found in the current studies (see Figures 5.1 and 5.2). For instance, use of collaborative social control appeared to be important in predicting both behaviour change (Studies 2 and 3) and affect change (Study 3). However, for positive social control, it was the congruence between the use and preference for the tactic that was associated with behaviour change (Study 3). Further, a different pattern emerged for negative social control. Adolescents' perception of negative social control as supportive predicted behaviour change (Study 3). Also, it appeared that perceiving any type of tactic as supportive was associated with more positive affect (Figure 5.2).

As revealed in Studies 2 and 3, collaborative social control was the type of social control that appeared to be consistently associated with positive behaviour change. Support for the emergence of this type of tactic as being associated with behaviour change comes from both the physical activity (Sallis et al., 2000) and broader adherence literature (Meichenbaum & Turk, 1987).

5.1 Contributions to the Physical Activity Literature

One of the key contributions flowing from the results of this dissertation to the physical activity literature was the finding that physical activity lapses appeared to be associated with the use of social control tactics as demonstrated in both Studies 1 and 2. As lapses have not received much attention in the physical activity literature (Conroy et al., 2007; Shields et al., 2008; Simkin & Gross, 1994), the results of this dissertation provide support for the possibility that lapses in activity initiate social control attempts.

Also, the results suggest that an examination of that slice of activity behaviour wherein a lapse occurs, shares a different relationship with influences by others than the positive one typically reported in the literature when social influences in general are examined (Pugliese & Tinsley, 2007; Sallis et al., 2000). Specifically, results of the current studies suggested an inverse relationship in that social control use increased following a decline in activity (i.e., lapse). A reason for this departure from previous activity results may

be that factors associated with a physical activity lapse may be different from other situations such as maintenance or initiation of physical activity.

In Studies 2 and 3 examining adolescents (i.e., older than 12 years of age), it was revealed that parents (active parents in Study 2) appeared to play a role in regulating their adolescent's physical activity behaviour through the use of social control. This contrasts with a previous suggestion in the literature that the major source of influence during adolescence is peers rather than parents (Beets et al., 2006; Duncan et al., 2005). While this dissertation did not examine the impact of peers, the current findings suggest that we cannot discount parents when examining adolescent physical activity behaviour, especially when their child experiences a physical activity lapse.

A fourth contribution to the physical activity literature is the importance of parental activity for use of social control. Specifically, the results of these studies suggest that it appears to be the active parents who regulate their children's lapse behaviour. If active parents are the ones who form a norm that their child be active for health benefits, it may suggest a need to focus on less active parents.

5.2 Contributions to the Social Control Literature

In addition to contributions to the physical activity literature, several contributions were made to the social control literature. First, the studies within this dissertation examined a physical activity lapse, which reflects an actual deviation from the desired behaviour. This contrasts with several studies in the social control literature, which have examined the use of social control concurrently with behaviour, without focusing on the context of the previous health behaviours (Lewis & Rook, 1999; Rook et al., 1990). The focus on physical activity lapses, or a violation of expectations, provided an opportunity to demonstrate the construct of social control as a reaction to a lapse in normative behaviour (Clark & Gibbs, 1965).

Additionally, this dissertation used a conceptual framework adapted from Lewis and Butterfield (2005) to describe the anticipated relationships. In an attempt to reduce the confusion in the social control literature, Lewis and Butterfield (2005) presented a model that depicted the relationship of social control to behaviour in two ways: (1) as a result of behaviour (i.e., a physical activity lapse) and, (2) as a cause of behaviour (i.e., one's reaction to social control). In Studies 1 and 2, social control appeared to be used in response to a physical activity lapse, while Studies 2 and 3 supported the idea that use of social control

may be associated with subsequent behaviour. Collectively the results appear to be in support of their conceptual model.

As findings from past social control literature have revealed mixed results (e.g., Fekete et al., 2006; M. M. Franks et al., 2006; Tucker & Anders, 2001), another contribution of the present studies was the inclusion of possible moderators to help clarify the physical activity lapse - social control (i.e., antecedents) and social control - reaction (i.e., consequences) relationships. The findings from Studies 1 and 2, which examined parent activity as a moderator of the physical activity lapse - social control relationship, suggested that active parents are the ones using social control in response to a physical activity lapse. This is important for the social control literature because it suggests that those individuals who hold a norm for the desired behaviour may be the ones who will exert social control (Clark & Gibbs, 1965). When examining the use of social control, it then might be suggested that it is important to use a moderator variable that represents a norm or expectation for the desired behaviour.

Similarly, moderators appeared to be important in understanding how individuals in Studies 2 and 3 reacted to social control (i.e., consequences). The current results might help to explain the inconsistent findings from previous prospective studies examining the relationship between use of social control and future behaviour (Helgeson et al., 2004; Westmaas et al., 2002). Specifically, it was found that both the preferences for positive social control and perceptions of supportiveness associated with negative social control enhanced the prediction of behaviour change in Study 3. These findings highlight the idea that an individual's reactions to social control may be complex and depend on other factors.

Another contribution to the social control literature was the use of the agent's perceptions of control. By assessing parent's perceptions of control, a sense of whether the parent was trying to regulate (i.e., use social control tactics) his/her child's behaviour was provided. This is important given that several social influence tactics have been used to describe both social control and social support in previous studies (e.g., encouragement, Duncan et al., 2005; Lewis et al., 2004). The assessment of this perception of control provided further support for the use of social control in response to a lapse, as parents reported using various tactics in attempts to regulate (i.e., persuade) their child to increase activity behaviour.

Finally, previous research in the area of social control has focused on the spousal relationship (Fekete et al., 2006; M. M. Franks et al., 2006; Helgeson et al., 2004; Tucker & Anders, 2001), or on older adults receiving control from family and friends (Rook & Ituarte, 1999; Rook et al., 1990). As the suggestion has been made to examine other relationships including the parent-child relationship (Lewis et al., 2004), another contribution of this dissertation was the extension into the parent-child/adolescent relationship where it might be surmised that social control would be used as parents play a role in the development of health behaviours in their children (Dishion & McMahon, 1998). Additionally, as social control is thought to help with the internalization of norms for behaviour (Umberson, 1987), it may be one tool that parents use to transmit norms to their children.

5.3 Contributions to Design

This dissertation made two contributions to the design of studies exploring physical activity lapses and social control. First, throughout this dissertation, several different methodologies were used to explore lapses including hypothetical scenarios, prospective design, and retrospective recall. Study 1 used hypothetical lapses, which may be limited in its ability to generalize to the real world (Lanza, 1990). Study 2 followed adolescents prospectively over a one-year period and examined lapses that occurred naturally; however, the reason precipitating the lapses (e.g., sickness or injury) was not assessed. Finally, Study 3 required adolescents to recall a previous lapse and respond based on their memories. One main limitation of this method is the accuracy of the recall (Shiffman et al., 1997). While these methods have inherent limitations, the replication of the findings using multiple methods provides converging support for the validity of the findings and provides some confidence that the results are not specific to one type of methodology, but are identified with different designs.

A second contribution is the consideration of a dyadic approach. As social control functions within relationships, considering both sides of the relationship provides a more holistic view of the constructs. In this dissertation, parents and adolescents were examined to get both perspectives on physical activity lapses.

5.4 Limitations and Future Directions

While this dissertation made contributions to the physical activity and social control literature, it is not without its limitations, and each limitation provides an avenue for future

research. One main limitation of these three studies was the use of convenience samples that may have had unique characteristics. These convenience samples may limit the ability to generalize the findings from the present dissertation to other populations. Further research with a broader population of parents and adolescents is needed to provide support for the use of social control in the parent/child relationship. Similarly, further research needs to extend the physical activity lapse - social control relationship to other populations. For example, as physical activity lapses have been suggested as important in post-menopausal women (Conroy et al., 2007), exploring the use of social control in response to physical activity lapses may be important in that population as well.

Another possible limitation of these studies may be failure to consider the role that the child's development may have played in the social control – physical activity behaviour relationship. Drawing on research examining the parent-child relationship (e.g., Noack & Buhl, 2004b), one might expect differences in the types of social control used by parents during different child developmental periods. For example, as adolescence is a period where the child is looking to develop his/her autonomy and independence (Noack & Buhl, 2004a), the parent may regulate fewer behaviours or may use types of social control that may not be viewed as controlling (i.e., collaborative social control). In comparison, a parent of a pre-school child might focus on trying to encourage his/her child to enjoy physical activities, and as such, may use more positive types of social control. Not only may the types of social control used differ by the age of the child, but also how the child reacts to the social control. For example, as an adolescent is negotiating autonomy and independence, use of more controlling influences (i.e., negative) may not be effective unless the adolescent views the behaviours as supporting his/her independence (i.e., perceptions of supportiveness). Future research should consider these possible age differences as they relate to both use of social control by the parent and the reaction of the child to the influences received.

There also is some existing research in the social control area that suggest that females may be more effective providers of social control than males (Markey et al., 2008; Umberson, 1992; Westmaas et al., 2002). Given that the use of social control by mothers and fathers could not be distinguished in the two studies (Study 2 & 3) in this dissertation that examined reactions to social control, future research should examine whether adolescents react differently to the social control provided by mothers versus fathers.

Researchers also have speculated that the male and female differences seen in the effectiveness of social control may be due to the caregiving role of females (Markey et al., 2008; Umberson, 1992). As it is possible that either a mother or father could be the primary caregiver or 'gatekeeper' for a child's physical activity, future research may wish to examine whether a distinction exists in the social control used and its effectiveness for parents who are primarily involved in their child's physical activity behaviour (e.g., 'gatekeepers') versus those who are less involved.

Another possible limitation of the present studies was the use of a proxy measure of the parents' norms for the adolescents' physical activity (i.e., by using the parents' own physical activity level). A direct measure, which assesses parent's norms for their child's physical activity would be an improvement. Future research is necessary to examine if parent's physical activity is related to a norm for activity for their child, and in turn, how this norm is related to parent's use of social control.

Given that each of these three studies tested interactions, a comment on power is warranted. As variables in field research typically have a less extreme distribution than experimental research, interactions are more difficult to identify (McClelland & Judd, 1993). Additionally, as interactions are evaluated with a product score between two continuous variables, the reliability of this product variable is reduced, thereby decreasing the power of the test (Aiken & West, 1991). With this in mind, the tests of the interactions in this dissertation may have been under powered. However, an examination of the size of the effect for the interactions (i.e., R^2_{Δ}) provides some confidence in the findings, as it was found that when no interaction was found, the associated effect appeared minimal.

Finally, as little other research has examined social control in adolescents, future research should continue to develop the psychometric properties of the measure of social control. Preliminary support for the validity of the measure may be gleaned from the present dissertation, as the majority of the hypotheses were supported. Additionally, the three types (e.g., positive, collaborative, and negative) generally showed adequate internal consistency through all three studies providing some support for the reliability of measures. However, although preliminary support for the reliability and validity of the measure of social control was provided through the present studies, future research needs to further examine the validity and reliability of this measure.

Several possibilities exist for the continued assessment of the psychometric properties of the measure assessing parental social control. First, to further establish the reliability of the measure, test-retest stability should be conducted. However, given that social control is assumed to move with behaviour change, test-retest reliability needs to be conducted over a short duration, and when behaviour is expected to remain stable.

Additionally, research should consider further developing the construct validity for the measure. As the items were selected from adolescents' responses to open-ended questions (Spink, 2003) and the social control literature in adults (Lewis et al., 2004), further qualitative research with parents would be valuable to explore whether the items reflect the various methods that parents use to attempt to regulate their child. As well, evaluating the relationship between social control and social support would help provide support for the differing nature of these two forms of social influence, while providing evidence for the discriminant validity of the measure.

5.5 Links to Other Theories

As a conceptual framework was used to guide this study, future research should look to developing a possible theory for social control. Two possible theories to draw upon include self-determination theory (Deci & Ryan, 1987) and social cognitive theory (Bandura, 1986).

5.5.1 Self-Determination Theory

One of the main tenets of self-determination theory (SDT) is that motivation for a behaviour falls along a continuum ranging from controlled to self-determined (Deci & Ryan, 1987). It is thought that more self-determined forms of motivation (i.e., intrinsic motivation) are associated with greater performance of a behaviour (Ryan & Deci, 2000). On the surface, it might be assumed that the motivation from social control would capture controlling motivation (i.e., external regulation) as social control involves regulation by another, which would contrast with the findings of this dissertation. However, it also is recognized that self-determined motivations reflect a sense of autonomy or a personal endorsement of the behaviour that may be associated with outside influences that are internalized (Deci & Ryan, 1987).

SDT may provide a possible explanation for several of the findings from this dissertation. First, the relationship between collaborative social control use and behaviour

change that emerged in Studies 2 and 3 may be linked to constructs within SDT through the concept of choice. As noted earlier, collaborative social control may involve a sense of shared responsibility, which may convey a sense of choice to the adolescent. As choice may be associated with a more internalized motivation (Deci, Eghrari, Patrick, & Leone, 1994), and has been related to intrinsic motivation, effort, and task performance (Patall, Cooper, & Robinson, 2008), it may provide one possible explanation for the association found between collaborative social control and behaviour change in Studies 2 and 3.

As suggested by Deci and colleagues (1994), another way to promote internalization of motives when attempting to influence another to perform a behaviour is by providing a meaningful rationale as to the importance of the behaviour. Two of the items that assessed positive social control in this dissertation (i.e., tell them physical activity is good for them and tell them that physical activity is fun) would appear to involve the parent providing a rationale to the child for being physically active. Interestingly, in what may appear to be a paradox, the use of positive social control was not associated with behaviour change in this dissertation. However, the congruence between preferences and use of positive social control was associated with behaviour change. Given this, it might be speculated that for those who preferred positive social control, the rationale provided by parents (e.g., physical activity is good for you) might be more meaningful. If the adolescents who preferred positive social control viewed it as meaningful, then the rationale provided by parents may have served to facilitate the internalization of physical activity, thus fostering a more self-determined motivation, and subsequent behaviour change.

Negative social control used by parents, on the other hand, may reflect a form of social control that does not promote internalization of motives, as it may reflect increased pressure, and inter alia, reduced choice. In fact, in one of their studies, Deci and colleagues (1994) conveyed a "no choice" manipulation to participants by using words such as 'should', 'must', and 'have to', which may be reflective of ordering (i.e., one of the negative social control items used in the current studies). If negative social control, in fact, reflects controlling motivation, it would not be expected to be associated with positive behaviour change.

Although use of negative social control was not related to behaviour change, perceiving it as supportive was positively associated with behaviour change. Given that

perceptions of supportiveness for negative social control were related to behaviour change, one wonders how this perception of supportiveness might relate to autonomous or self-determined motivation. As social support has been defined as providing assistance that helps an individual attain his/her goals (Rook, 1995), perceiving negative tactics as supportive may have occurred when the adolescent viewed the parent's actions (i.e., order or nag) as supporting the adolescent's own endorsement of becoming more active. This sense of endorsement is highlighted by the high importance that adolescents reported for returning to their previous level of activity following a lapse (Study 3). If this endorsement of the behaviour change is the case, it may not be surprising that this perception of supportiveness was related to behaviour change, as endorsing the behaviours the adolescent views as important may be associated with increased internalization (i.e., more self-determined motives). As these associations between the types of social control and SDT are speculative at this point, further research is needed to examine the possible links between social control and self-determination.

5.5.2 Social Cognitive Theory

Another theory that may help explain the mechanisms in social control is social cognitive theory (SCT: Bandura, 1986). One aspect of SCT involves the idea of human agency, where personal agency represents the idea that individuals influence their own behaviours through a variety of processes including self-regulation (Bandura, 2001). Self-regulatory efficacy reflects the confidence to regulate one's own actions, and high levels of self-regulatory efficacy for exercise have been related to maintenance of exercise behaviour (Woodgate, Brawley, & Weston, 2005). Given that social control represents a form of regulation (Lewis & Butterfield, 2005), the questions arises as to how it might relate to self-regulatory efficacy. As one recognized source of self-efficacy is mastery experiences (Bandura, 1977), it may be possible that parents assisting the adolescent with the regulation of their behaviour following a lapse (i.e., using collaborative social control) may be associated with improved self-regulatory efficacy, and subsequent behaviour change.

Up to this point, the discussion has focussed on links to other theories to explain the consequences portion of the model. Social cognitive theory (Bandura, 1986) also may be useful in explaining the parent's reaction to a physical activity lapse. As social control is a behaviour on the part of the parent, it is possible that parents may have efficacy expectations

in their ability to regulate their child. It might be speculated, for instance, that active parents have had success in self-regulating their own activity behaviour and, as a result, have higher self-efficacy for regulating their child's behaviour as a function of this mastery experience. Future research should examine the possibility of these relationships among parents' physical activity, their self-regulatory efficacy, and their efficacy to regulate their child's behaviour.

Another form of agency that may help us to understand social control is proxy agency, where individuals rely on another to influence or regulate their behaviour (Bandura, 2001). Individuals in exercise classes have reported relying on a proxy agent (e.g., their exercise leader), and this reliance on a proxy was associated with reduced rates of self-regulatory efficacy (Shields & Brawley, 2006). Given this, one wonders whether adolescents rely on their parents to use social control to regulate their behaviour following a lapse, and in doing so, subsequently reduce their self-regulatory efficacy. As self-regulatory efficacy is thought to be related to an individual's ability to maintain a specific behaviour (Woodgate et al., 2005), undermining this self-regulatory efficacy may reduce the adolescent's ability to cope with *future* lapses. Given the possibility that social control may be associated with increased (i.e., through vicarious experience) or decreased (i.e., through reliance on a proxy) self-regulatory efficacy, further research is necessary to integrate the construct of social control with this aspect of social cognitive theory.

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Appendix A – Ethics Approval

University of Saskatchewan
Behavioural Research Ethics Board (Beh-REB)

24-Jul-2006

Certificate of Approval

PRINCIPAL INVESTIGATOR
Kevin Spink

DEPARTMENT
Kinesiology

BEH#
06-191

STUDENT RESEARCHERS
Kathleen Wilson

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED (STUDY SITE)
University of Saskatchewan
Saskatoon SK

SPONSOR
UNFUNDED

TITLE
Preferences for Parental Influences on Physical Activity

CURRENT APPROVAL DATE
21-Jul-2006

CURRENT RENEWAL DATE
01-Jul-2007

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS
The term of this approval is five years. However, the approval must be renewed on an annual basis. In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: *http://www.usask.ca/research/ethical.shtml*

APPROVED

Dr. John Rigby, Chair
Behavioural Research Ethics Board
University of Saskatchewan

Please send all correspondence to:

Ethics Office
University of Saskatchewan
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Appendix B – Study 1 Lapse Scenarios

Acceptable Drop:

Scenario 1 (Small drop): Usually, you would describe your child as physically active. He/she is regularly active 16 times a month (about 4 times a week). This has been his/her pattern for several years. However, during the last few months, his/her activity level has dropped and he/she is now doing less physical activity. This drop in physical activity is not due to anything obvious but just seems to be a new pattern of behaviour. Although your child's level of physical activity has dropped, your perception is that your child is still at a level that would result in health benefits. Your child is *just* meeting your standard for physical activity so you want his/her activity level to remain at least at this level.

Deviant Drop:

Scenario 2 (Large drop): Usually, you would describe your child as physically active. He/she is regularly active 16 times a month (about 4 times a week). This has been his/her pattern for several years. However, during the last few months, his/her activity level has dropped and he/she is now only doing very little physical activity. This drop in physical activity is not due to anything obvious but just seems to be a new pattern of physical activity for your child. You are *unhappy* with this new pattern of physical activity for your child. You do *not* think that this new pattern of activity is sufficient for your child to gain health benefits and you would like to see his/her physical activity level *increase* to his/her previous level.

Appendix C – Study 1 Social Influence Questions

1. How likely is it that you would *participate in physical activity so that your child could <u>see</u> you doing physical activities* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active? *(even if you answered 'not at all likely', answer this question and all similar questions as if you were to do this action)*

1	2	3	4	5	6	7
Not at all						**Very much so**

2. How likely is it that you would *say that your child is good in the physical activities he/she does* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

3. How likely is it that you would *urge your child to do physical activity* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

4. How likely is it that you would *say to your child that physical activity is good for him/her* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

5. How likely is it that you would *offer to be active with your child* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

6. How likely is it that you would *order your child to be active* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

7. How likely is it that you would *provide financial support (e.g., pay for equipment, the program, etc.) so your child can be active* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

8. How likely is it that you would *help your child to learn/improve the skills that he/she would use in being active* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

9. How likely is it that you would *watch your child when he/she is doing physical activities* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

10. How likely is it that you would *give your child encouragement to stick with his/her physical activities* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

11. How likely is it that you would *talk to your child about how much fun physical activity is* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

12. How likely is it that you would *nag your child to be active* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

13. How likely is it that you would *reward your child when he/she does physical activities* as a means of increasing your child's physical activity?

1	2	3	4	5	6	7
Not at all likely						**Very likely**

a) By doing this, I am trying to **persuade** my child to become more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

Appendix D – Study 1 Godin Leisure-Time Exercise Questionnaire

Your Child's Physical activity

During a **typical 7-Day period** (a week), how many times on the average does **your child** do the following kinds of exercise for **more than 10 minutes** during his/her free time? *(write on each line the appropriate number)*

Times Per Week

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) _____
(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE (NOT EXHAUSTING) _____
(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

c) MILD EXERCISE (MINIMAL EFFORT) _____
(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking)

Your physical activity level

During a **typical 7-Day period** (a week), how many times on the average do **you** do the following kinds of exercise for **more than 10 minutes** during your free time? *(write on each line the appropriate number)*

Times Per Week

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) _____
(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE (NOT EXHAUSTING) _____
(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

c) MILD EXERCISE (MINIMAL EFFORT) _____
(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snowmobiling, easy walking)

Appendix E – Study 2 MAQ-A

My Physical Activity

Circle all of the activities that you have participated in during the **PAST MONTH**. Do not include time spent in school physical education classes.

Aerobics	Aboriginal dance	Racquetball	Tennis
Badminton	Figure skating	Ringette	Track and field
Baseball	Football	Rugby	Ultimate Frisbee
Basketball	Garden/Yard Work	Running	Volleyball
Baton	Gymnastics	Skateboarding	Walking for exercise
Biking	Hiking	Skating	Water skiing
Bowling	Home exercise	Skipping	Weight training
Boxing	Ice hockey	Snow skiing	Wrestling
Canoeing/rowing	Street/Floor hockey	Soccer	Yoga
Cheerleading	In line skating	Softball	Other: _____
Curling	Kickboxing	Swimming	_____
Dance	Martial Arts	Taebo	_____

1. List each activity that you circled above in the "Activity" box below.
2. For **each** activity, record the number of times you participated **each** week for the last 4 weeks.
3. For **each** activity, estimate the average number of minutes that you spent participating **each** time. Record this in the last box. Only report the time that you were actively participating in the activity.

ACTIVITY	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Average Number of Minutes You Were Active in the Activity EACH Time**

Appendix F – Study 2 Social Influence Items

D. *The following questions deal with your family and their physical activity habits. Please tell us how often the following statements pertain to you.*

1. In the last month how often did you wee any of your family members (mother, father, brothers, sisters, grandparents) participate in physical activity?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

The following questions deal with support you may or may not receive from your family. Please tell us how often the following statements pertain to you.

1. In the past month, how often did any of your family members say that physical activity was good for you?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

2. In the past month, how often did any of your family members offer to be active with you?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

3. In the past month, how often did any of your family members order you to be active?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

4. In the past month, how often did any of your family members provide financial support (e.g., paid for equipment, the program, etc.) to help you be active?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

5. In the past month, how often did any of your family members help you learn/improve the skills that you use in being active?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

6. In the past month, how often did any of your family members give you encouragement to stick with your physical activity program?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

7. In the past month, how often did any of your family talk to you about how much fun physical activity is?

1	2	3	4	5
Never	Almost Never	Sometimes	Often	Very Often

Appendix G – Study 3 Lapse Prompt

Read the following carefully. Imagine the situation described below. The following questions concern what your parent(s) ***did (PART A)*** *in the following situation as well as what you would* ***want (PART B)*** *them to do:*

> Think back to a time where your physical activity had dropped and it was clear to you that you had a low level of physical activity. This time of very little physical activity must have lasted for at least 2 weeks. This drop in physical activity was not due to anything obvious (e.g., sickness, injury).

1. How long ago was this time when your activity level dropped? *(please check)*

_____ present time
_____ last month
_____ 1-11 months ago
_____ more than 1 year ago

2. How long did this time of low physical activity last? *(please check)*

_____ 2 weeks
_____ 3-4 weeks
_____ more than 1 month

3. How important was it to you that you change your activity pattern back to what it previously was before the drop in activity? *(please circle)*

1	2	3	4	5	6	7
Not at all Important						**Very Important**

4. How important was it to your parent(s) that you change your activity pattern back to what it previously was? *(please circle)*

1	2	3	4	5	6	7
Not at all Important						**Very Important**

Appendix H – Study 3 Questions: What the Parents Did

PART A – What your parent(s) did

Keep the situation described above in mind as you answer the following questions. Please answer the following questions by circling the response that best describes how your parent(s) acted.

When your activity level dropped, did you notice your parent(s) doing any of the following things to influence you to be more active?

1. Parent(s) *participated more in physical activity themselves to influence you through their example*?

1 2 3 4 5 6 7
Never Frequently

If you answered 1 (never), please skip to Question 2.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*
1 2 3 4 5 6 7
Not at all Very much

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?
1 2 3 4 5 6 7
Not at all Very much so

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*
-3 -2 -1 0 1 2 3
Very negative Neutral Very positive

2. Parent(s) *said that you were good in the physical activities you do*?

1 2 3 4 5 6 7
Never Frequently

If you answered 1 (never), please skip to Question 3.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*
1 2 3 4 5 6 7
Not at all Very much

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

3. Parent(s) *urged you to do physical activity*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 4.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

4. Parent(s) *said to you that physical activity was good for you*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 5.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

5. Parent(s) *offered to be more active with you*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 6.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

6. Parent(s) *ordered you to be active*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 7.

How did your physical activities **change** because of this? *(please check)*
_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do

a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	-2	-1	0	1	2	3
Very negative			**Neutral**			**Very positive**

7. Parent(s) *provided financial support (e.g., pay for equipment, the program, etc.) so you could be active*?

1	2	3	4	5	6	7
Never						**Frequently**

If you answered 1 (never), please skip to Question 8.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	2	3	4	5	6	7
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do

a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	2	3	4	5	6	7
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	-2	-1	0	1	2	3
Very negative			**Neutral**			**Very positive**

8. Parent(s) *helped you to learn/improve the skills that you would use in being active*?

1	2	3	4	5	6	7
Never						**Frequently**

If you answered 1 (never), please skip to Question 9.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	2	3	4	5	6	7
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

9. Parent(s) *watched you more when you were doing physical activities*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 10.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

10. Parent(s) *gave you more encouragement to stick with your physical activities*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 11.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

11. Parent(s) *talked to you more about how much fun physical activity was*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 12.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

12. Parent(s) *nagged you to be more active*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 13.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

13. Parent(s) *rewarded you when you did physical activities*?

1	**2**	**3**	**4**	**5**	**6**	**7**
Never						**Frequently**

If you answered 1 (never), please skip to Question 14.

How did your physical activities **change** because of this? *(please check)*

_____ decreased _____ increased _____ no change

How **much** did your physical activities **change** because of this? *(please circle)*

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much**

Use the following scales to indicate what you think your parent(s) was trying to do
a) By doing this, I think my parent(s) was trying to **support** me in becoming more active?

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

b) How did you **feel about what your parent(s) was trying to do most to influence you**? *(please circle)*

-3	**-2**	**-1**	**0**	**1**	**2**	**3**
Very negative			**Neutral**			**Very positive**

PART B – What you <u>want</u> your parent(s) to do

Keep the situation described at the beginning in mind as you answer the following questions. Please answer the following questions by circling the response that best describes how you would <u>want</u> your parent(s) to act if the same situation occurred again.

If the same situation was to occur again, indicate how much you would <u>want</u> your parent(s) to do <u>each</u> of the following behaviours in your attempts to be more active ?

1. **Parent(s)** ***participate in more physical activities so that I could <u>see</u> them doing physical activities*****?**

1 2 3 4 5 6 7
Not at all Very much so

2. **Parent(s)** ***say that I am good in the physical activities I do*****?**

1 2 3 4 5 6 7
Not at all Very much so

3. **Parent(s)** ***urge me to do more physical activity*****?**

1 2 3 4 5 6 7
Not at all Very much so

4. **Parent(s)** ***say to me that physical activity is good for me*****?**

1 2 3 4 5 6 7
Not at all Very much so

5. **Parent(s)** ***offer to be more active with me*****?**

1 2 3 4 5 6 7
Not at all Very much so

6. **Parent(s)** ***order me to be active*****?**

1 2 3 4 5 6 7
Not at all Very much so

7. **Parent(s)** ***provide financial support (e.g., pay for equipment, the program, etc.) so I can be active*****?**

1 2 3 4 5 6 7
Not at all Very much so

8. **Parent(s)** ***help me learn/improve the skills that I would use in being active*****?**

1 2 3 4 5 6 7
Not at all Very much so

9. **Parent(s)** ***watch me more when I am doing physical activities*****?**

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

10. **Parent(s)** ***give me encouragement to stick with my physical activities*****?**

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

11. **Parent(s)** ***talk to me about how much fun physical activity is*****?**

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

12. **Parent(s)** ***nag me to be active*****?**

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**

13. **Parent(s)** ***reward me when I do physical activities*****?**

1	**2**	**3**	**4**	**5**	**6**	**7**
Not at all						**Very much so**